22 PRODUCT REVIEWS: PAGE 176 • 51 NEW PRODUCTS: PAGE 215

MACWORLD

The Macintosh® Magazine May 1989 $3.95 Canada $4.95



BRAVE NEW WORLD

Macworld Goes Desktop
Page 19

SPECIAL EFFECTS FOR TYPE FONTS

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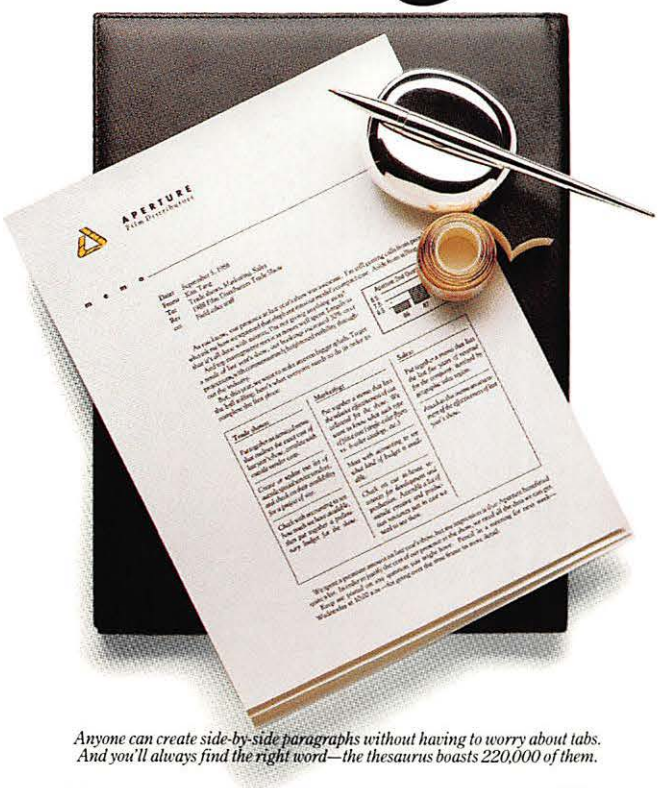
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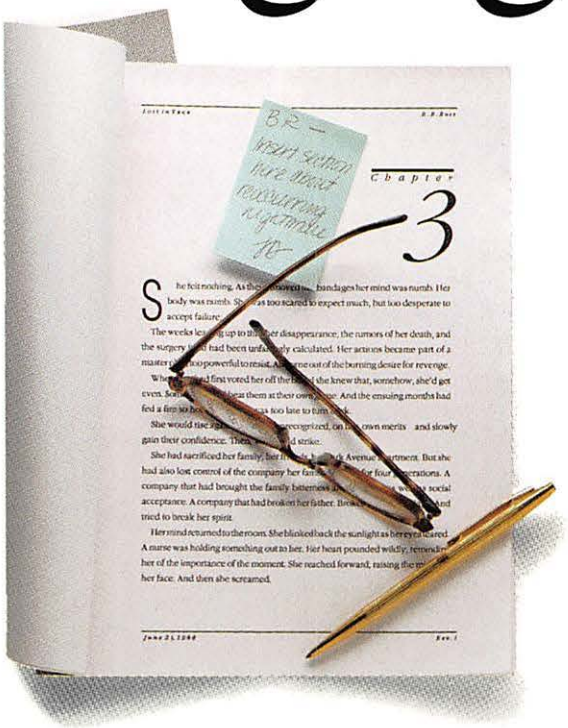
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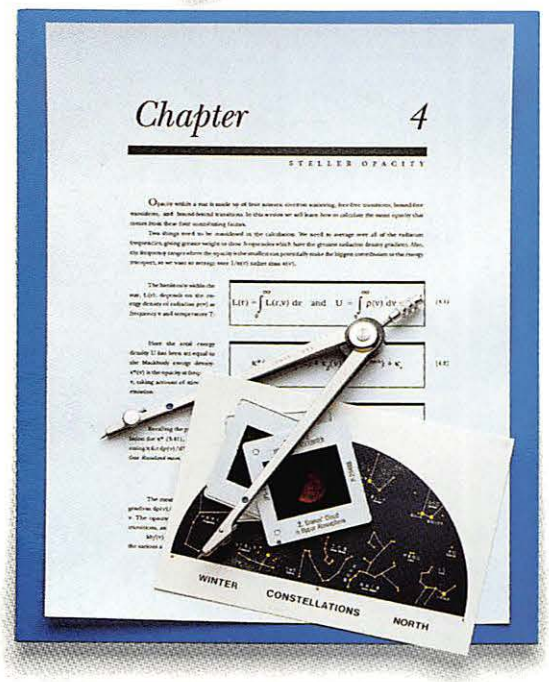
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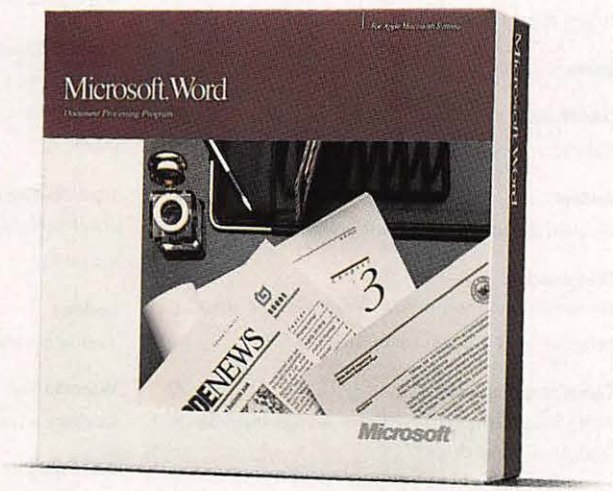


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MACWORLD

The Macintosh® Magazine May 1989



With this issue, **Macworld** *takes the plunge into desktop publishing (p. 19). (Illustration by Ron Chan.)*

DEPARTMENTS

How to Contact *Macworld* 8

Commentary/Jerry Borrell 19
Brave New Macworld: Our magazine goes DTP.

Letters 37

David Bunnell 45
Taking a second look at HyperCard.

Art Beat 53
By Ann Garrison / How our cover was created.

The Iconoclast 59
By Steven Levy / Stephen Wolfram and his amazing program will change mathematics.

Conspicuous Consumer 73
By Deborah Branscum / There are no shortcuts to finding a good dealer.

State of the Mac 85
By Thom Hogan / When it comes to color, what you see is rarely what you get.

New Products 215
A quick look at new Macintosh hardware, software, and accessories.

HOWTO/Quick Tips 225
By Lon Poole / MacCalc table lookups, using the Mac abroad, making a monitor support arm, and more.

HOWTO/Getting Started with HyperCard 243
By Jim Heid / Learn how to exploit HyperCard's versatility.

Updates 257
The latest software upgrade news.

Where to Buy 261
Contact information for products in this issue.

Best-Sellers 304



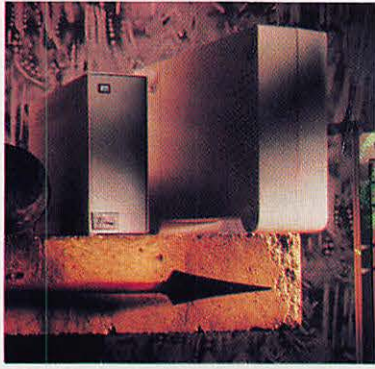
NEWS

Mac Bulletin 13
Late-breaking news.

Macworld News 95



■ **Tough Mac Works Fast** GreenSpring ruggedizes the Mac II for industry. ■ **ColorSpaceFX Supports Video** Mass Microsystems' board captures live video in real time. ■ **DTP in China** Chinese students learn desktop publishing. ■ **Better Connections for Less** Dayna Communications offers a less expensive network. ■ **MS-DOS Rapport** A Kennect device lets you read DOS from your floppy drive. ■ **Hypermedia Duck Mystery** An interactive educational experiment. ■ **VideoMaker** Film professor creates a video-editing control program. ■ **New Color Boards from RasterOps** 24- and 32-bit boards bring better color to the II. ■ **MacMusicFest 2.0** Musicians confer about the Mac.



Check our buyer's guide to large-capacity hard drives (p. 158).

Features

Shopping for Scanners.....124
By Steve Roth/Choosing the right scanner depends on your needs and your budget. Here's how to find the black-and-white scanner that's right for you.

Enhancing PostScript Fonts.....134
By Erfert Fenton/You don't have to be a graphic designer to jazz up your type. Font-editing programs let you add your own distinctive touch to PostScript fonts.

Getting Down to Black & White.....142
By Bruce F. Webster/Color may look flashier, but black-and-white and gray-scale have their advantages. Here are the best noncolor monitors for the SE and the Mac II.

Brushes with Color.....151
By Erfert Fenton/Overwhelmed by the dizzying array of color paint programs? Find out which one you should buy.

Massive Media.....158
By David Pogue/In the market for a hard disk? Think big—with a high-capacity drive, you'll get more for your buck.

Picking the Best Presenter.....166
By Phillip Robinson/Which presentation package should you use? Here's how the top five contenders measure up.



Color-separate and manipulate scanned images (p. 176).



Reviews

PhotoMac 1.0.....176
Color correction/separation program.

Photon Paint 1.1.....178
Color paint program with special effects.

WriteNow 2.0.....180
A fast and efficient WP bargain.

Panorama 1.0.....182
Flat-file database.

Exstatix 1.0.1.....189
Statistical software package.

WORM Drive with Software.....191
APL-800WD, WriteImage, Optical Disk Interface Software.

Copy II Mac 7.2.....195
Disk copy and utility program.

Andrew Tobias Managing Your Money 2.0.....196
Personal financial planning.

NuPaint 1.0.....198
Bitmapped monochrome paint program.

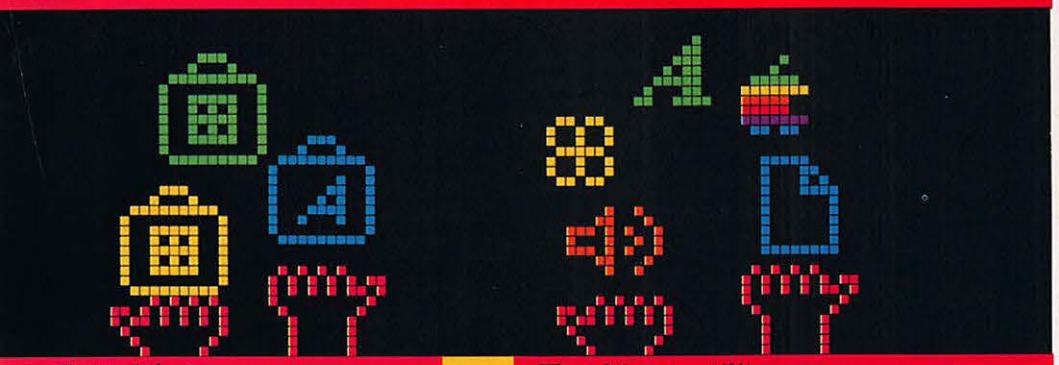
Focal Point II 1.0.....200
Time-and-project manager.

Shufflepuck Cafe 1.0.....202
Fast-paced action game.

Irwin Backup 5080 Tape Drive for Macintosh.....207
80MB cartridge tape backup with EZTape.

The Hobbit Trilogy.....209
Text adventure games with graphics.

Window Shopping.....211
Stacks, Joker Poker, and ConvertUnits.



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Publisher's statement can be found on page 8.



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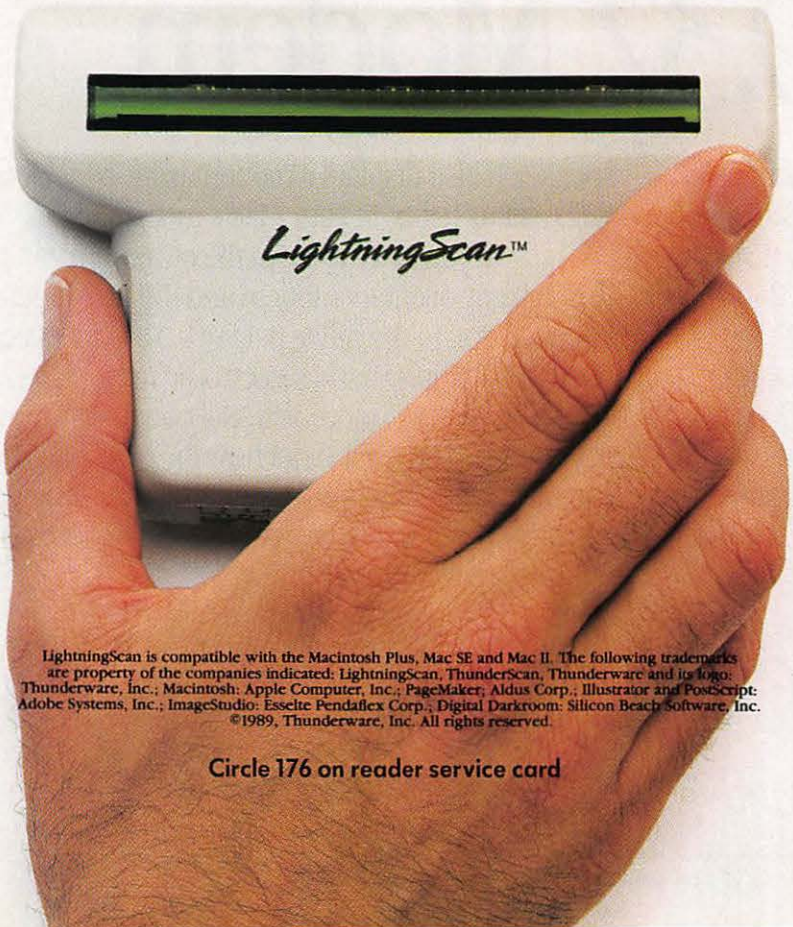
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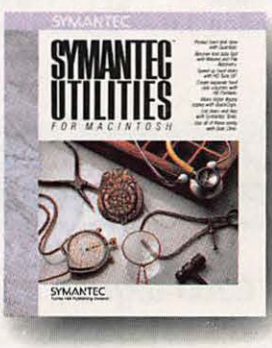
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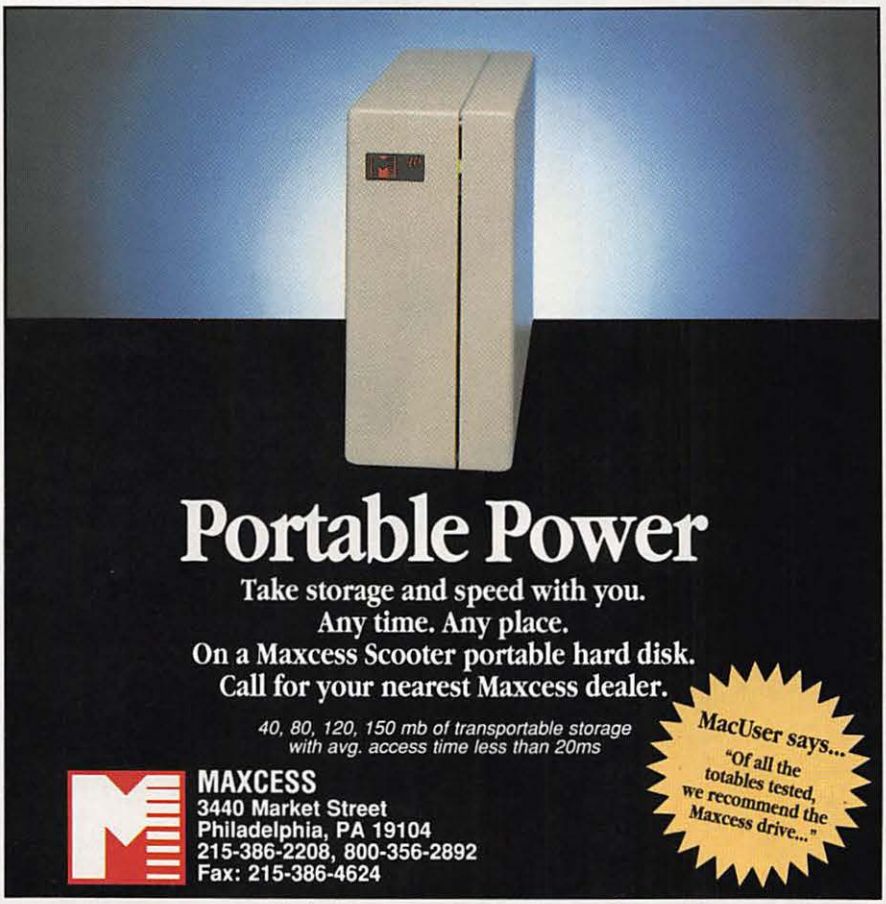
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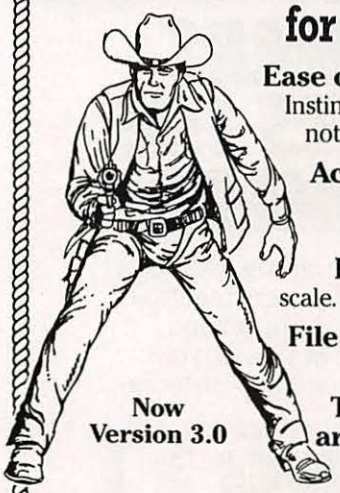
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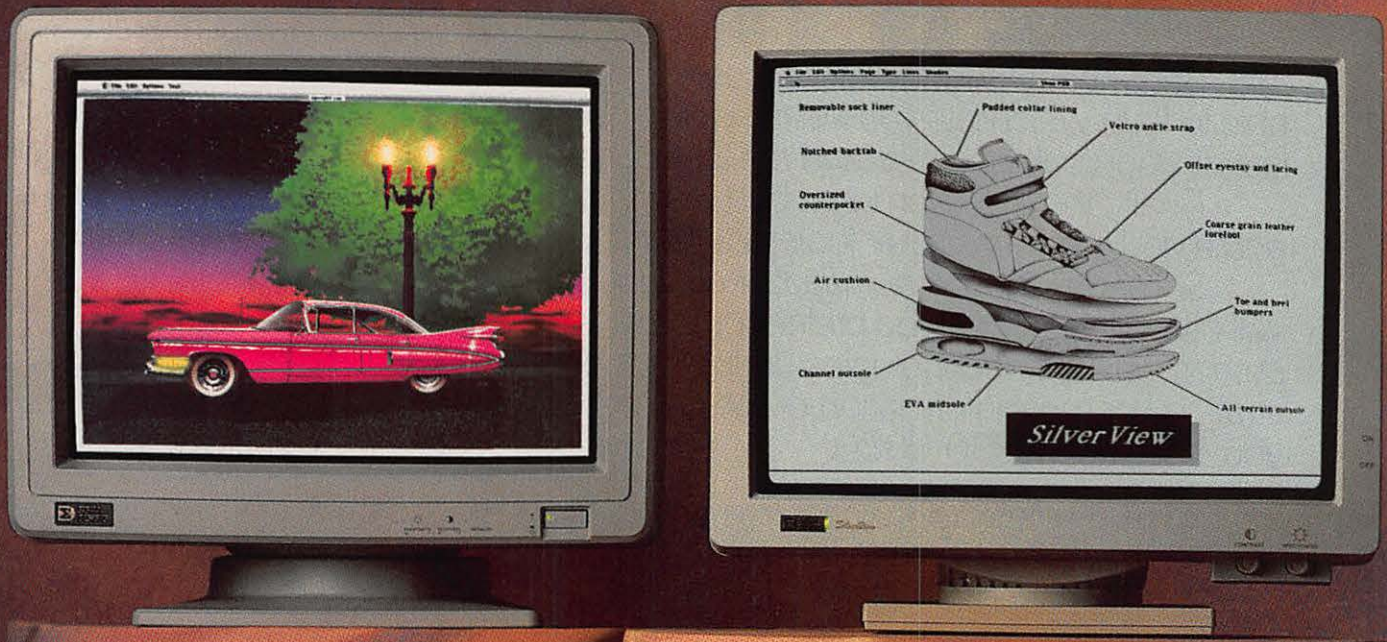
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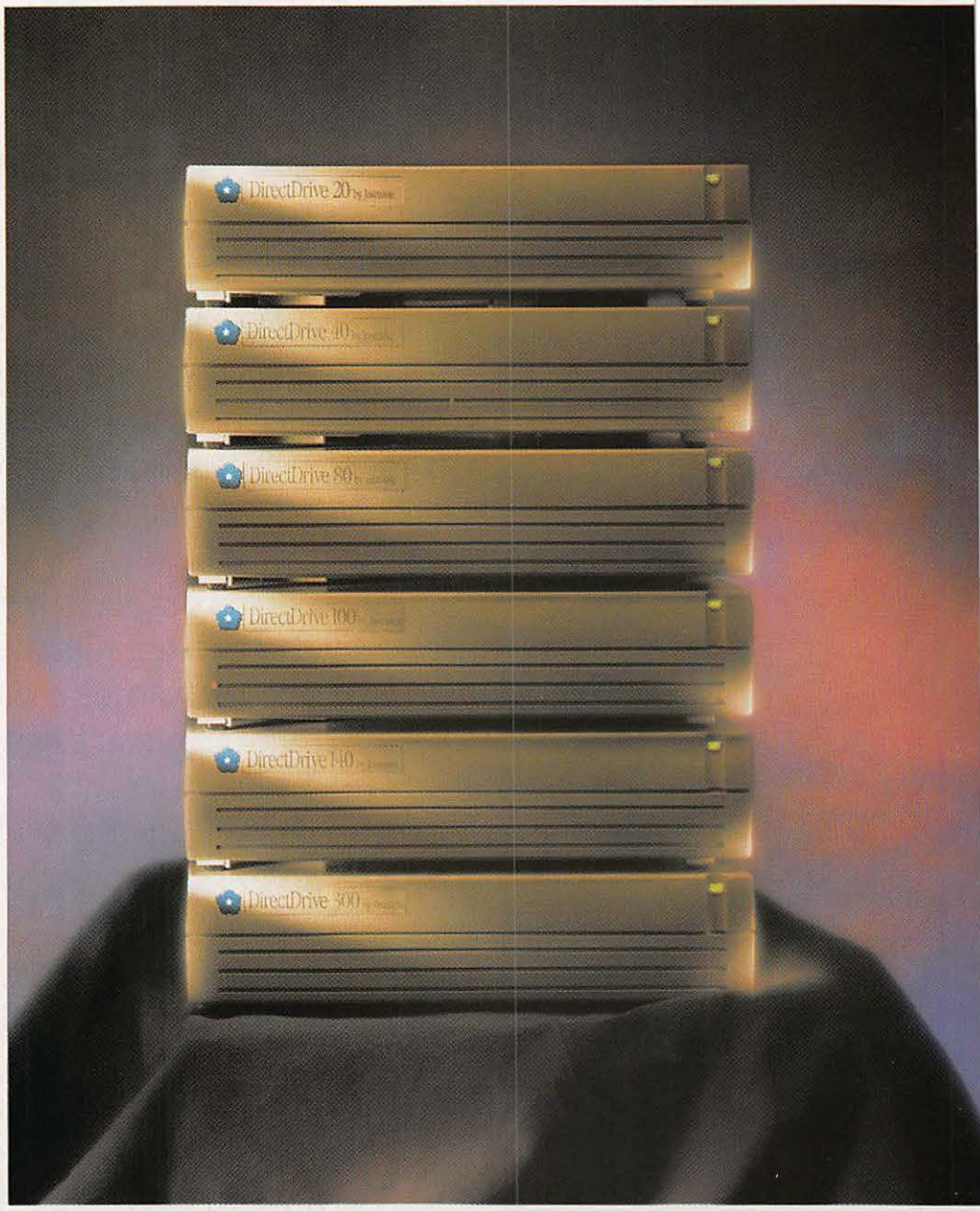
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MAC BULLETIN

INDUSTRY NOTES

Powder Blue Ships Mac Clones

Powder Blue Computers says it is shipping Mac clones with legal Mac ROM BIOSes. The company is acquiring the 128K ROM from several sources, mostly surplus resellers. The list price of the BlueMaq line ranges from $4395 for a 68000 machine with 1MB of RAM, a floppy drive, and a 65MB hard disk, to $7499 for an 030 system with 4MB of RAM, a floppy drive, an 85MB hard disk, and a 14-inch monitor. The Mac II and Mac IIx–compatible systems do not support color displays. For further information, call Powder Blue Computers at 801/273-3993.

Berger Leaves for Sun

Chuck Berger, vice president of Apple's systems integration unit, has left to take on the job of vice president of product marketing for Sun Microsystems' entry systems group. Berger's departure is the latest of several by high-level Apple executives since last summer, and it's all the more important because of his destination. Sun is expected soon to introduce a low-end computer that will compete head-on with the Macintosh.

And Boesenberg Resigns

Turmoil in Apple's marketing division led to the resignation of Charles Boesenberg, Apple USA's senior vice president of sales. Boesenberg took a senior position with MIPS Computer Systems, maker of RISC microprocessors. David Hancock, Apple's senior vice president of marketing, then reorganized the division into six separate units. William Coldrick, former vice president of northwestern operations, took Boesenberg's former seat.

Rodime Drops Prices

Rodime cut prices on hard disks to match or beat Apple's lower prices. External 20MB and 45MB hard disks and the Rodime RX line of internal hard disks for the Mac SE, SE/30, II, and IIx, were all included in the cuts.

Color Extension to PageMaker

Aldus Corporation has announced an extension to PageMaker 3.0 for those who desire color capability for the page-layout program. Called **PageMaker Color Extension,** it will be available in the second quarter of 1989. PageMaker Color Extension supports the display of encapsulated PostScript (EPS), text, and TIFF files. It will run with 32-bit QuickDraw to produce 24-bit color.

The new extension also incorporates the Pantone Matching System, so you can run it on a black-and-white system, choose colors from the Pantone palette, and produce color-matched color output. With monochrome laser printers, the extension supports gray-scale output of color TIFF and EPS files. It also lets you produce color hard copy on color PostScript printers. PageMaker Color Extension also can work with PostScript-compatible imagesetters such as the Linotronic.

Aldus also introduced Alpine, **a proposed standard interface for prepress systems**. For registered Mac PageMaker users the extension costs $150; suggested list price is $200. For more information, call Aldus at 206/622-5500.

Color for the 512KE and Up

Aura Systems has developed a peripheral **device for adding color to a Mac Plus, an SE, or a Mac 512KE** with a SCSI upgrade. Scuzzygraph is a peripheral device that sits under the Mac and plugs into the SCSI port. All Scuzzygraph models provide 16 colors and full QuickDraw compatibility. The lowest-cost model is compatible with color monitors with up to 720-by-512-pixel resolution; higher-cost models work with both digital and analog monitors with up to 1280-by-1024-pixel resolution. Any QuickDraw-compatible software will work with Scuzzygraph, and anything the screen shows in color can also be printed in color. For further information, contact Aura Systems at 619/438-7730.

Motorola's 68040 to Break the Million-Transistor Barrier

Motorola recently revealed early details of the 68040 microprocessor, which will incorporate 1.2 million transistors. The chip will incorporate the complete 030 instruction set and will be 100-percent compatible with software for the entire 68000 family, Motorola said. The chip adds a higher-speed integer unit, a floating-point math unit, and improved instruction and data caching. The 040 will include a new hardware mechanism for multiprocessing support. Motorola will formally unveil the 040 during the third quarter.

Apple Sets Mac IIcx Prices

At the introduction of the Mac IIcx in March, Apple announced system-unit prices that range from $4669 with 1MB of RAM to $7552 with 4MB, an 80MB hard disk, and A/UX installed. A $5369 configuration includes 1MB of RAM and a 40MB hard disk, while a system unit with 4MB of RAM and an 80MB hard disk retails for $7069. All the configurations include a mouse and one SuperDrive, but keyboards, display boards, and monitors are extra. The IIcx costs about $300 more than an equivalent SE/30 and about $800 less than an equivalent Mac II.

MacProject II 2.0 Bows

Claris has begun shipping a new version of MacProject II that adds features including automatic and interactive resource leveling. MacProject II 2.0 can also analyze resources allocated to multiple projects, calculate using actual or projected data, access multiple charts, and create an unlimited number of custom calendars.

The suggested retail price of MacProject II 2.0 is $499. An upgrade from MacProject II 1.0 is free if the program was purchased after February 1; otherwise it's $65. Upgrading from MacProject will cost $199. For more information, call Claris at 415/960-1500.

(continues)

INDUSTRY NOTES

Macworld Expo Asia

The first Macworld Expo in Asia will be held at the Raffles City Convention Center in Singapore from June 29, 1989, to July 2, 1989. For further information, contact Macworld Expo Asia '89 at 415/341-2227.

New Apple HQ

Apple announced the opening of its new Atlanta operations headquarters, the fifth such unit in the country. The southern operations group, covering six regional sales groups in 11 states, began full operation in January. The group also includes major corporate headquarters in Charlotte, North Carolina, as well as Tampa, Miami, New Orleans, Dallas, Houston, and Tulsa.

HyperEngine Help

Seven developers are introducing products using HyperEngine, a stack-access technology that provides online help and reference. The seven are Claris Corporation of Mountain View, California; Layered, of Cambridge, Massachusetts; Onset Computer Corporation of North Falmouth, Massachusetts; Neuronics, of Cambridge, Massachusetts; Channelmark Corporation of San Mateo, California; Telerobotics of Knoxville, Tennessee; and PictorGraphics, of Richardson, Texas. HyperEngine is based on Symmetry's HyperDA software.

3Com Makes the Mac Connection

3Com Corporation of Santa Clara, California, has announced an agreement with Pacer Software of La Jolla, California, to codevelop software allowing Macs to use file and print services on a 3Com 3+Open LAN Manager network. Another 3Com partnership, this one with France's Telesystemes Reseaux, is developing an X.400 gateway and X.25-based router for worldwide exchange of electronic mail among 3Com networks.

Claris Cuts Support

Claris Corporation announced that only Claris customers are now eligible for the company's Customer Relations and Technical Support services, including telephone hotline support, and notification of product upgrades. Previously, Claris had supported users with Apple-labeled versions of its products.

1.44MB Floppy Drive

Peripheral Land (PLI) has developed a 1.44MB high-density floppy drive that reads and writes to 720K or 1.44MB disks made by both Apple and IBM. Called TurboFloppy, it works with the Mac Plus and up, without upgrades or extra controllers.

MS-DOS files appear in conventional Macintosh windows and can be opened with compatible applications or converted to other formats with Apple File Exchange utilities.

TurboFloppy connects to the Mac via the SCSI bus. The drive can also be daisy-chained with other peripherals. For further information, contact Peripheral Land at 415/657-2211.

Apple's 160MB Hard Disk

Apple has added a 160MB internal hard disk to its list of peripheral products for the Mac II or IIx. The hard disk has 327,780 disk blocks of 512K each. Average seek time is 18 milliseconds, and start-up time is 20 seconds. The unit connects directly to the Mac II or Mac IIx via the SCSI connector. For further information, contact Apple Computer at 408/996-1010.

Plasma Touch Screen

NexSys has developed a plasma display screen, the TarMac, that responds to the touch of a finger or a pointing device, just as a graphics tablet would. TarMac gives you more control by sensing how hard you press. For example, you could select a shape by touching the screen and then fill it in by pressing harder. You can place TarMac on a work table or in a frame, or use the unit just like any monitor, and the standard Mac monitor remains active.

TarMac's screen can be as large as 1728 by 1280 pixels (24 by 17.8 inches). That's **two tabloid pages side by side** at a full 72 dots per inch, which should make the screen useful for publishing, among other applications. For further information, contact NexSys at 212/995-2224.

MSI's TableTools Brings Table Creation to the Mac

TableTools, from Mansfield Systems (MSI), gives Macintosh users a wide variety of tools and options for building WYSIWYG tables. Instead of having to handle the various components of **complex financial or scientific tables** in separate applications—tabular material in a spreadsheet, graphics in a paint or draw program, and so on—you do it all in one environment and place the completed table directly into a desktop publishing program. TableTools's unique From Within Shuttle transfers data quickly between applications from within TableTools. You can edit data or create graphics and charts inside cells using other applications; TableTools also creates tables from Excel files and includes a complete word processor. Suggested retail price is $395; for more information, call MSI at 800/872-3332.

AppleFax Is Back, and Hopefully Better

Apple is staging a comeback for its much-beleaguered AppleFax Modem, which the company pulled off the market in October. Version 1.2 software, available free from Apple, **fixes incompatibilities** with some Group 3 facsimile devices and addresses a character-collision tendency in the AppleFax. For more information, call Apple Computer at 408/996-1010.

Spam, Spam, and Spam

SPAM (Speed-up for Apple Mathematics), a new product from Bravo Technologies, is an INIT/CDEV combo that **doubles the speed of math (floating-point) operations** on the Mac. SPAM is especially good for improving the speed of math, statistics, database, CAD, and graphics programs on a Mac Plus or SE without an accelerator board or floating-point chip, but it will increase computation speed on any Mac. SPAM costs $79; for more information, contact Bravo Technologies at 415/841-8552.

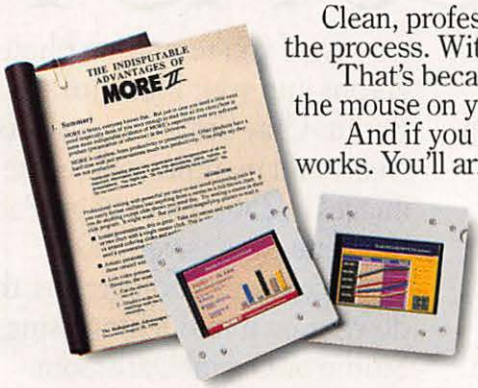
High-Capacity Storage and Backup

New on the market from MicroNet Technology is the Micro/Max series of SCSI hard disks for the Mac Plus, SE, or II: the SBX-159im (150MB), the SBX-300im (300MB), and the SBX-620im (600MB). Hard disks in the Micro/Max series come with a **universal power supply for use anywhere in the world,** and boast a 16.5ms access time. An optional tape-backup system with a capacity of 60MB, 150MB, or 300MB can be included with the Micro/Max or can be added later with a tape kit from MicroNet. For information, call MicroNet Technology at 714/837-6033. ■

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David Pogue, MacWorld writer

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80mb	12ms	~~$1049~~ $999
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MacUser, March 1989

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Software supports hard and soft volumes.	☑	☐
Share most serial devices over LocalTalk.	☑	☐
Change volume size without reinitializing.	☑	☐
Create file volumes on a fragmented disk.	☑	☐
Software compacts & defragmentizes files.	☑	☐
Software includes read, write & seek tests.	☑	☐
Software selection of the interleave factor.	☑	☐
Password protect and write-lock volumes.	☑	☐
Link up to 7 drives into one large volume.	☑	☐
Volumes support UNIX and other systems.	☑	☐
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Brave New Macworld

How Macworld came to be desktop published

by Jerry Borrell

Once in a great while magazines undergo a redesign, one of the most uncertain times in the life of a publication. And these days, magazines are thinking about how to make the shift to electronic or desktop publishing, another great uncertainty. For reasons too convoluted to explore here, we decided that *Macworld* would do both at once. And we succeeded. The issue in your hands incorporates both a new design (including new departments of the magazine) and the use of desktop publishing tools to produce all of the editorial portions of the magazine except four-color photographs.

In the late summer of 1988 we began planning. The design group began working on a redesign. I began holding staff meetings to consider our path toward DTP. As time passed, it became clear that we would gain the greatest efficiency by implementing both at the same time. Note that I do not say we chose the easiest path.

The design of *Macworld* had been sagging under the weight of our growth since the last changes I directed, in the fall of 1986. Even then it was clear that the magazine needed more work, and as our average issue approached 300 pages the problems grew more noticeable. The typography was the basis of many problems—our Garamond face was overused and underpowered. We needed different weights of type and different type sizes. Our design specifications, although tuned in 1986, had been with us since the magazine was founded in 1984, when *Macworld* was much smaller. In those days it wasn't as necessary to cram information into a given amount of space, and there was less need to provide readers with relief from the dense technical content of our articles. Many elements of our design cried out for attention—the table format, the sidebar format, the use of a single typeface.



Designer Dennis McLeod led the group that completed the design you now see. The main changes: addition of a sans serif face (Futura), more flexible design specifications for our features and reviews, changes to the layout of departments (needed to make them stand out more from advertising in the back and front of the magazine), and additional elements (for example, several levels of subheads) throughout to make articles more readable despite the complexity of the material.

Another goal that I set some while ago was the improvement of informational graphics for our articles. To this end Dennis hired Arne Hurty, winner of Aldus Corporation's FreeHand illustration contest for 1988. We knew we needed someone with a strong conceptual illustration background and a command of computer graphics tools for the Mac if we were to make a difference.

At the same time we wanted to change the editorial focus somewhat in departments, to support changing aspects of the Mac market. We kept our How To's, which support novice users, in the back of the magazine: *Getting Started, Insights,* and *Quick Tips*. We retained our editorial well for features, and in the front we added *State of the Mac, Conspicuous Consumer,* and *Art Beat. State of the Mac*'s origin is found in the shift of 25-plus percent of our readership to the Mac II. Thom Hogan, a respected writer and a

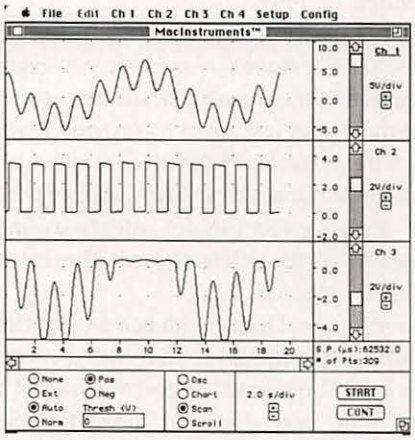
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PHOTOGRAPHS BY ROBERT HOLMGREN

The design team of Dennis McLeod (rear), Leslie Barton, and Andrew Faulkner created Macworld's new look.

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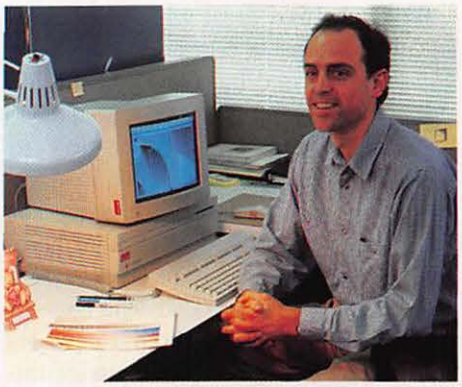
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Arne Hurty specializes in informational graphics, which he often creates in Aldus FreeHand.

coeditor of the *Macintosh II Report* newsletter, keeps our readers abreast of what's happening with Apple's open-architecture machines. Deborah Branscum, formerly of *Macintosh Today, InfoWorld,* and *Mother Jones,* has taken on the task of becoming our reader ombudsman with the *Conspicuous Consumer* column. In addition, Deb seeks to shed light on major issues of concern to Mac owners. *Art Beat* is our chance to tell readers, over 60 percent of whom use computer graphics programs, how we produce the art for our magazine. *Art Beat* will vary between a detailed description of one major project and overviews of how several pieces were rendered for an issue.

DESKTOP PUBLISHING

From the moment we began thinking about the redesign, it was clear that we would have problems with desktop publishing. One overarching goal for the redesign was to provide greater design flexibility, allowing us to provide readers with more variation in our layout. Few of the designers believed that desktop publishing tools were up to the task.

So we began by evaluating desktop publishing packages. The initial group for evaluation included Interleaf, Aldus PageMaker, ReadySetGo, and QuarkXpress. Interleaf was soon eliminated because it is more suitable for long documents with strict formatting and without intensive use of graphics. ReadySetGo was eliminated next, because the designers weren't entirely comfortable with its procedure for laying out pages and because it lacked the ability to handle four-color specifications. Then we looked at QuarkXpress, which offered many features not found in PageMaker—color output, greater leading control, better table layout.

Still, PageMaker was an emotional favorite with many of the designers. They were familiar with PageMaker's "pasteboard" environment. They preferred its cut and paste features. We also recognized that Aldus was an older, larger company, and since we know all too well the vicissitudes of the software publishing industry, there was a feeling that part of our decision should be based upon the stability of the software company. Not that Quark is unsound. In 1988 it was the fastest-growing company in Mac DTP, but its revenues are dwarfed by Aldus's.



After the copy editors have completed a manuscript, the art department creates a layout. Here Hae Yuon Kim sizes color transparencies while designing the New Products section using PageMaker.

For a while, evaluation stalled. It was during this period that the reality of what we hoped to accomplish hit home. Moving a magazine of our size—a circulation of 325,000 and a print run of over 400,000—to desktop publishing had not been done elsewhere in the world.

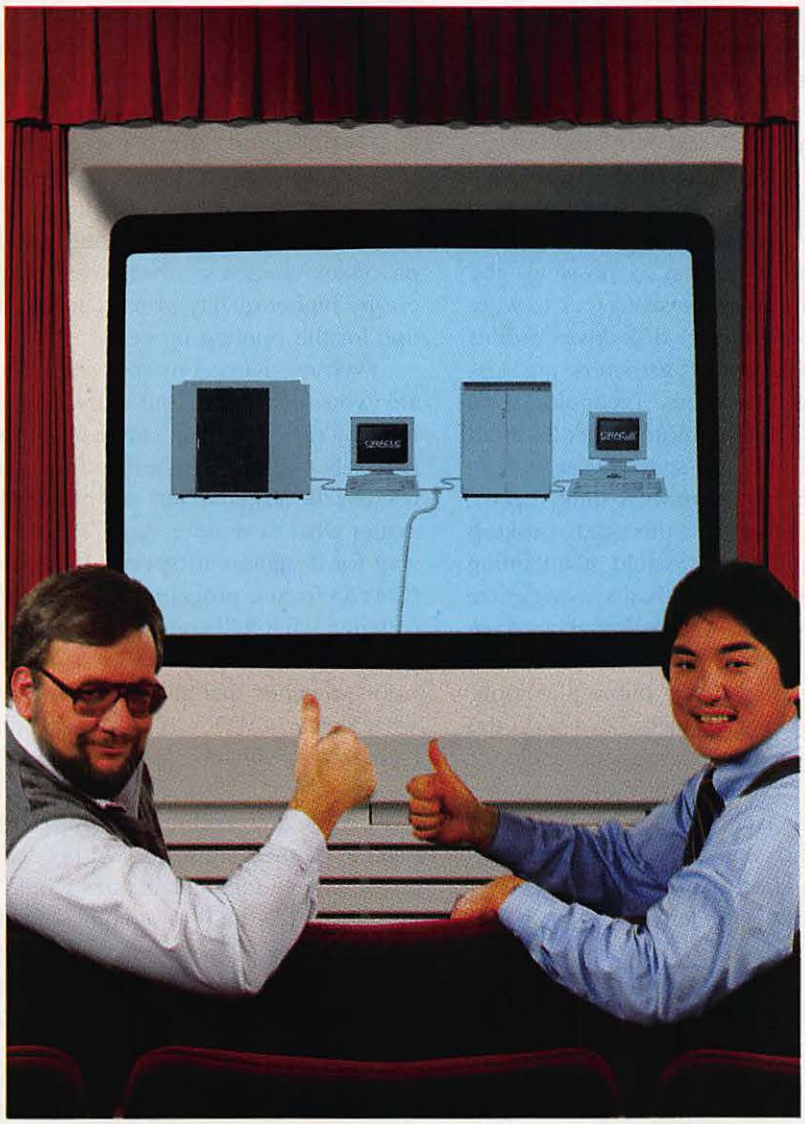
The anomaly of *Macworld* is that we produce a monthly magazine twice the size of *Esquire,* or half again as big as many issues of *Smithsonian* and *Travel & Leisure.* Our circulation is much smaller, but the magazine itself is larger. One reason: there is more Mac advertising (at a lower cost per page than in the publications mentioned above). We use as much four-color photography and illustration as many of the larger publications. We like to think that our demands for quality are as high as these publications.

Not only must we produce a well-

(continues)

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Dan Shafer, *Author of Hypertalk Programming*

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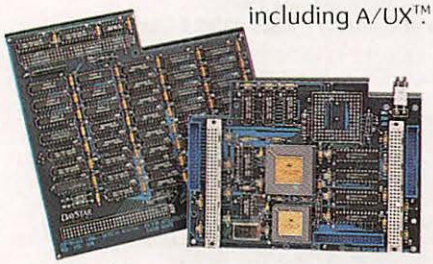
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Senior features editor Adrian Mello confers with a writer. Assigning editors format edited manuscripts using a Microsoft Word style sheet before passing them on to the copy editors.

written and well-designed publication, we must also have an intimate knowledge of the products and technologies that we write about. And we must produce articles in as timely a fashion as possible—the computer industry moves too fast to write an article on last year's disk drives. Stories on Nepalese honey gatherers are less sensitive to time issues. Technology and business writing are more immediate than fiction and most life-style coverage.

In short, who were we to think that we could shift a magazine this size to desktop publishing methods while maintaining our level of quality? We had a saving grace in that over the past several years we have written and worked extensively with developers of desktop publishing tools. Our artists and designers have used the Mac for several years. And fortunately we were able to hire Luis Camus, former assistant managing editor of *Macintosh Today,* who was vital to the desktop publishing effort there. Luis had scars of experience but the energy to push our work forward.

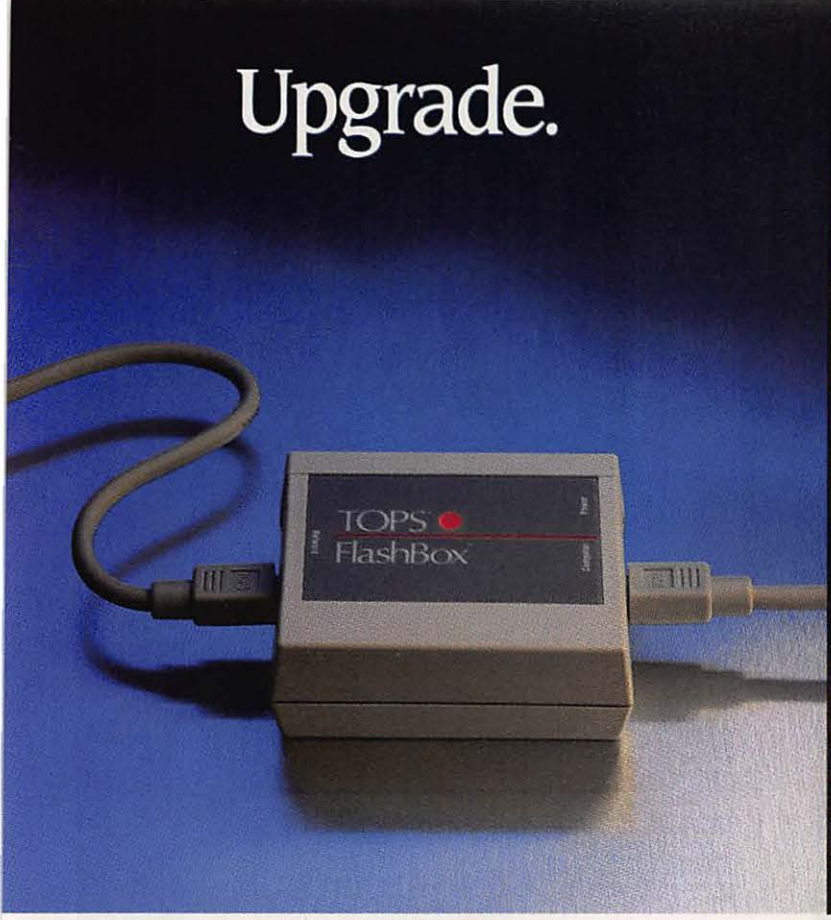
So as redesign plans moved forward, desktop planning progressed anew, and eventually questions about the redesign began to be directed toward desktop publishing tools. Could we get half-point sizes in type? What about the typefaces that we wanted? How good was the registration of film output from Linotronic imagesetters? Would the loss of resolution (1250-dpi type output versus our previous 2400) make the magazine less readable? Could we really specify CMYK colors from Mac programs? Could we afford the loss of color density when using Linotronic film? Many of these issues were raised in evaluating the DTP packages.

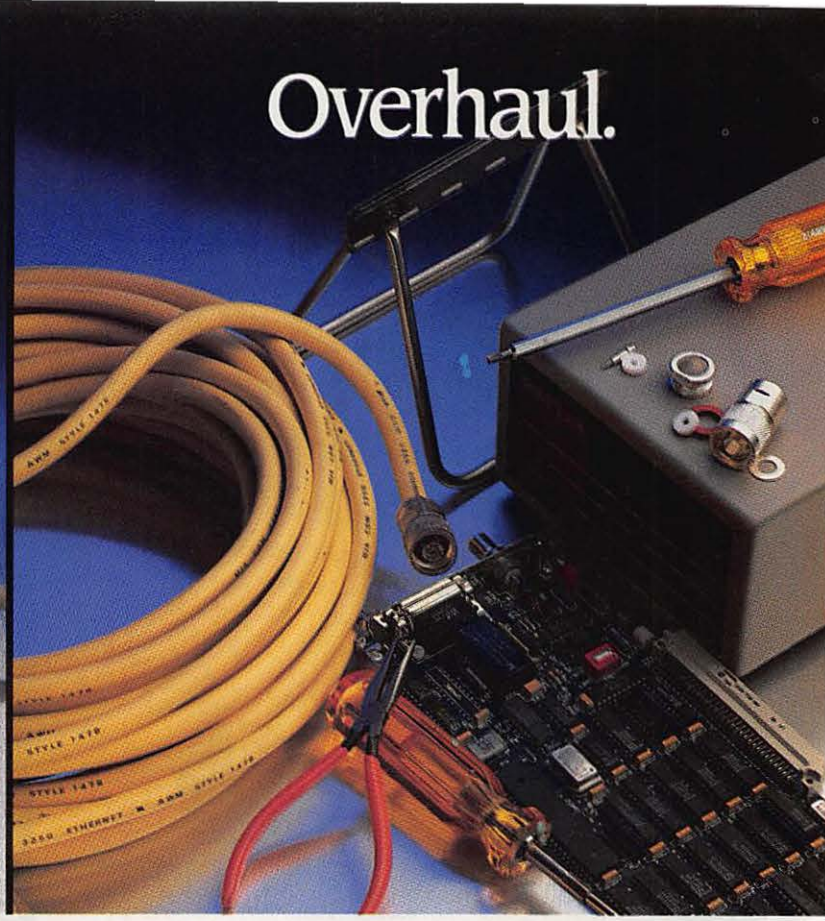
While I was dreaming of working in glorious four-color, the designers were telling me there was simply no way to do it. And the reality of that hit home all too soon. The film quality of Linotronic output varied depending upon how the film developer was running at any given time. The registration samples we produced were acceptable for type, but not good enough for color. Some publications, to be sure, are printing color output using Linotronic separations, but ours are typically pulled from Crosfield laser film plotters—with several times the quality of Lino output—before being stripped into fully composed pages. Finally the art director pointed out that our printing processes needed a silver-based film to ensure higher-quality print plate production for the printing process.

Even mechanical or spot-color issues are worrisome. The four-color schemes implemented in Mac software do not precisely correlate to the Pantone colors used by the lithographers and printers (no matter what developers say). There is no way for designers to specify four colors (CMYK) from a program and know with certainty what will come out. In the end, Luis was forced to produce a book of color swatches that show our designers what a given CMYK mixture will produce (see *State of the Mac* for more on color issues).

We began asking developers for patches to their software. We needed to know when additional features would be available. We had to commission the design of typefaces that were not available from Adobe or Linotype. Luis began running film tests with several local suppliers to find out what the quality, turnaround time, and working relationship was likely to be. In the end we chose Krishna Copy Center, the local mecca for desktop publishing, and Design & Type, a Bay Area typesetter, to supply us with film and fully composed pages on resin-coated paper (what we call repro). Acquiring a Linotronic was never an attractive alternative for us—maintenance, changing technology, and our level of use

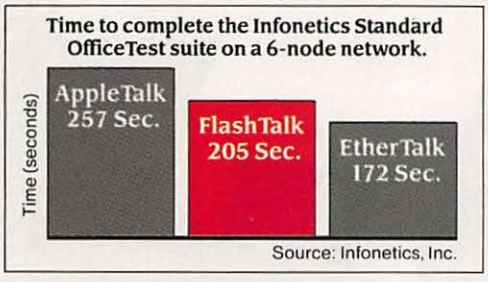
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How to give Ethernet a run for the money.

Some people may think the way to rev up a LocalTalk network is to rip the whole thing out, lay some heavy cable, and send your computers out for an Ethernet implant. Spending big bucks in the process.



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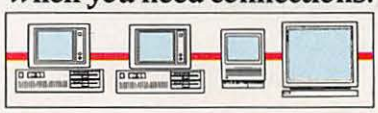
For just $189 per node, FlashBox delivers fully 80% of Ethernet performance for just 20% of the cost. How? By turning your LocalTalk network into a high-speed freeway moving data at FlashTalk rates of 770 Kbps.

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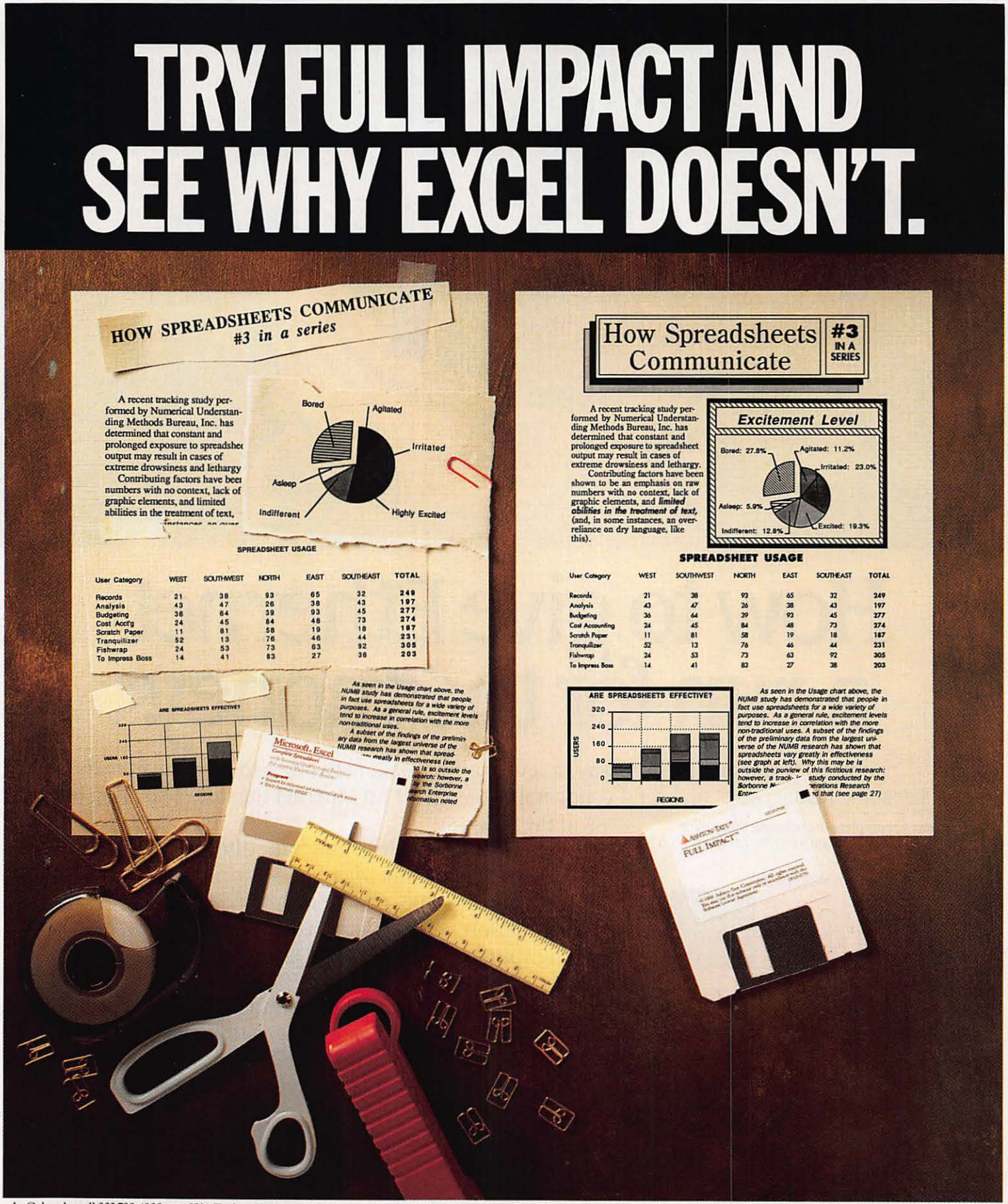


Actual performance of your network may vary depending on the quality and length of network cable, network size and configuration. To achieve best performance, you should connect a FlashBox to each Macintosh. Using FlashBox with bridges, gateways, or other AppleTalk-only devices may require network reconfiguration or the addition of repeating devices.

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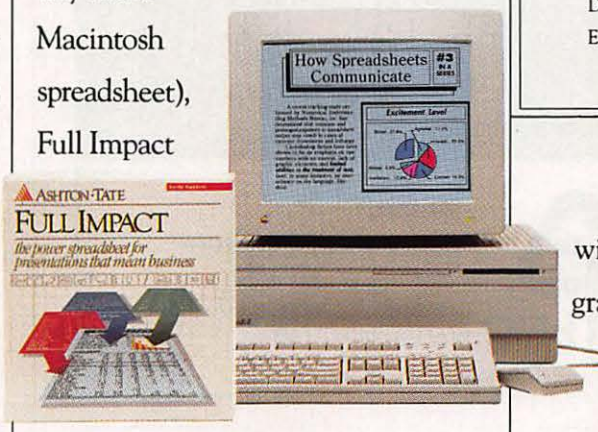
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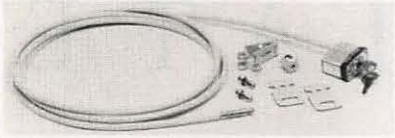


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do not merit the cost.

Not surprisingly, Dennis decided to use PageMaker for the redesign. Aldus was selected because of its product, the company's willingness to work with us, planned additions to the software, and geography (it's easier to fly to Seattle from San Francisco than to cities where the other companies are based—important in solving those all-too-frequent problems).

CONSERVATIVE APPROACH

Another fortunate confluence of events was the breakup of our parent company, PCW Communications (a subsidiary of IDG), into independent business units. Formerly we shared centralized typesetting with *PC World* magazine. As the business units sought autonomy, it was a propitious time to seek alternatives for producing the magazine. Editorial production shifted to the editorial department under managing editor Charlie Barrett.

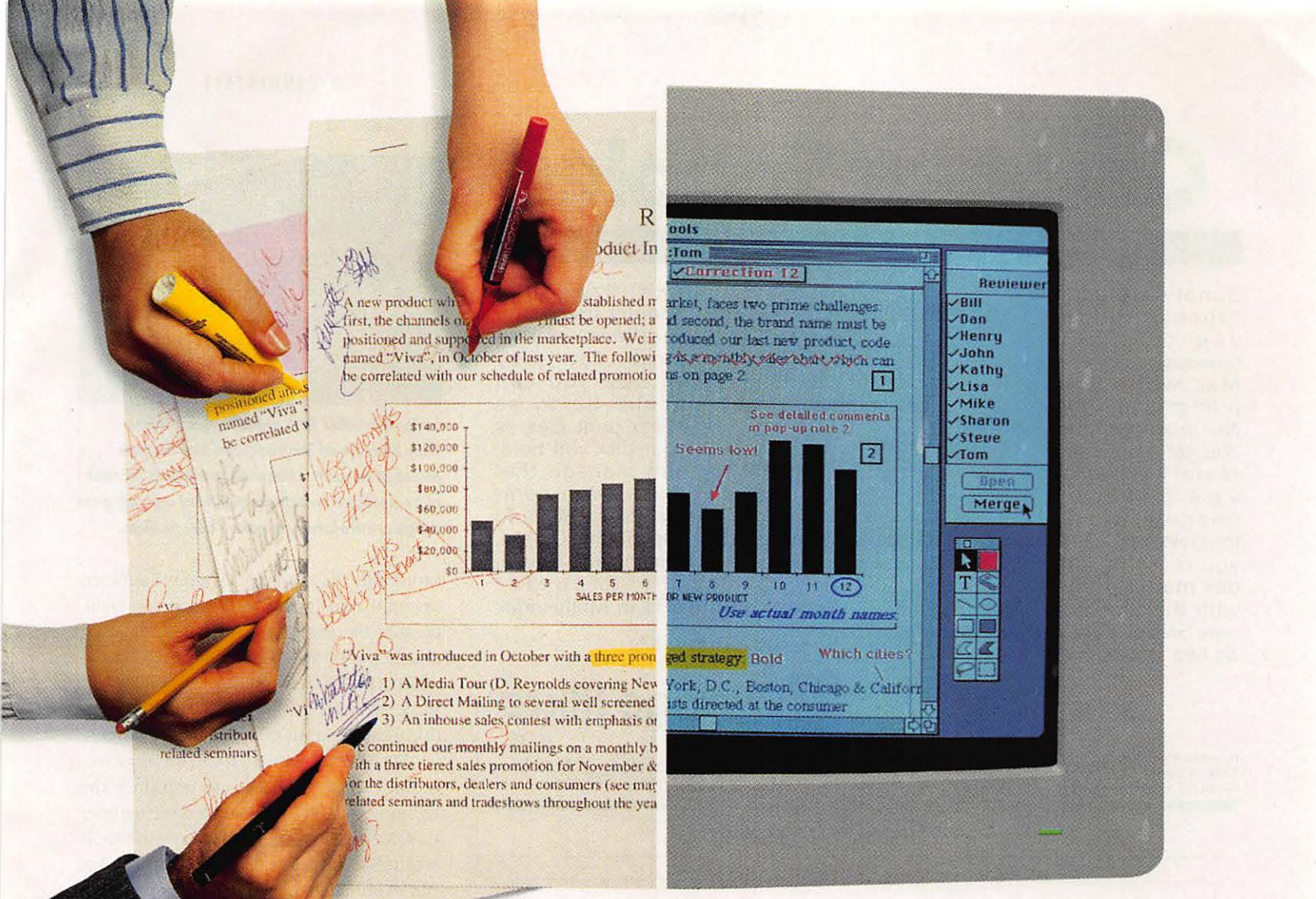
We took a conservative approach to implementing the changes in editorial production. At present we continue to copyedit on paper, although that may change as our production experience matures. This decision avoided near-term issues of whether copy editors had to edit on screen and of changing the day-to-day work of a talented group of professionals.

The changes among the editors have been evolutionary as well. Now editors supply the production group (via the copy editors) with documents formatted in Microsoft Word style sheets. After an initial copyedit, the editorial production staff pours news, reviews, and departments documents into single-column PageMaker templates for proofing galleys. Departments, the most strictly formatted section of the magazine, are poured by the editorial production group into final galleys. News, features, and reviews go to artists and designers who design and pour these sections.

THE IMPLEMENTATION

We began slowly. Long hours were spent designing charts of how the processes would work. New staff had to be hired and trained for the edit production group. Extensive PageMaker training was the

(continues)



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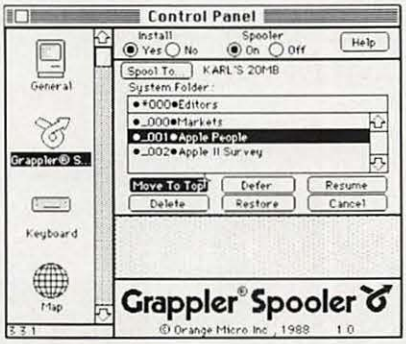
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As a matter of fact, MacWorld called Redux "almost fun backups." (Sep88)

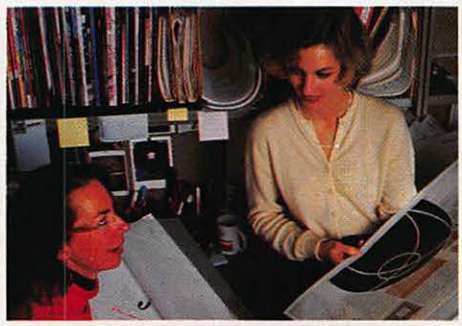
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Senior copy editor Ruth Henrich and copy editor Emily Bower proof Linotronic repro that has been pasted up on boards. Macworld uses boards for much of its production because the traditional approach gives designers more leeway in making color decisions.

order of the day. Luis and Andrew Faulkner, one of the designers on the redesign team, created the templates for news, reviews, and departments. The schedule of copyediting for each stage of the process had to be worked out, with time for production staff to input copy editors' changes.

We've left plenty of room for improvement. Part of the plan is to introduce the technology in a nonthreatening manner that allows all of us to learn how the tools work. We have lots of problems to solve, but eventually we will tackle issues such as timeliness of production, four-color page manipulation, and more. For now, we have plenty to do.

EQUIPMENT

True, we had many Macintoshes in the art department already and lots of in-house expertise to rely upon. This is probably the foundation of our bravado in this effort, but DTP brought changes almost immediately. Another fortuitous benefit of *Macworld*'s becoming independent was the unification of our art, editorial, and editorial production departments on a single floor. Networking was less onerous, but two AppleShare zones had to be established to avoid bogging down the network. There has been a degradation of performance for the 40 of us on the network, but it's minimal.

Equipment demands went up quickly. The designers needed Mac IIs to work on large PageMaker files with any facility. So did the editorial production staff. Five megabytes of memory was required for

(continues)

Pop Quiz.

Stop. This is a test. For the next 60 seconds, we will be conducting a quiz about Macintosh® II Videographics. Do not turn the page until you have looked at the visual clue and answered all the questions.

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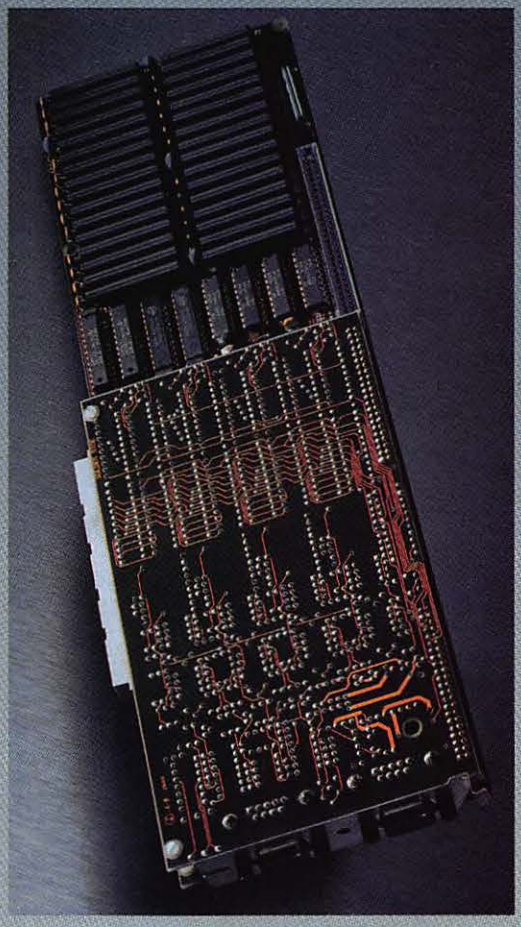
a) NuVista 2M b) NuVista 4M c) All of the above

Name the only videographics card which provides true-color, real-time capture *and* broadcast-quality display while occupying only a single slot in a Macintosh II.

a) NuVista 2M b) NuVista 4M c) All of the above

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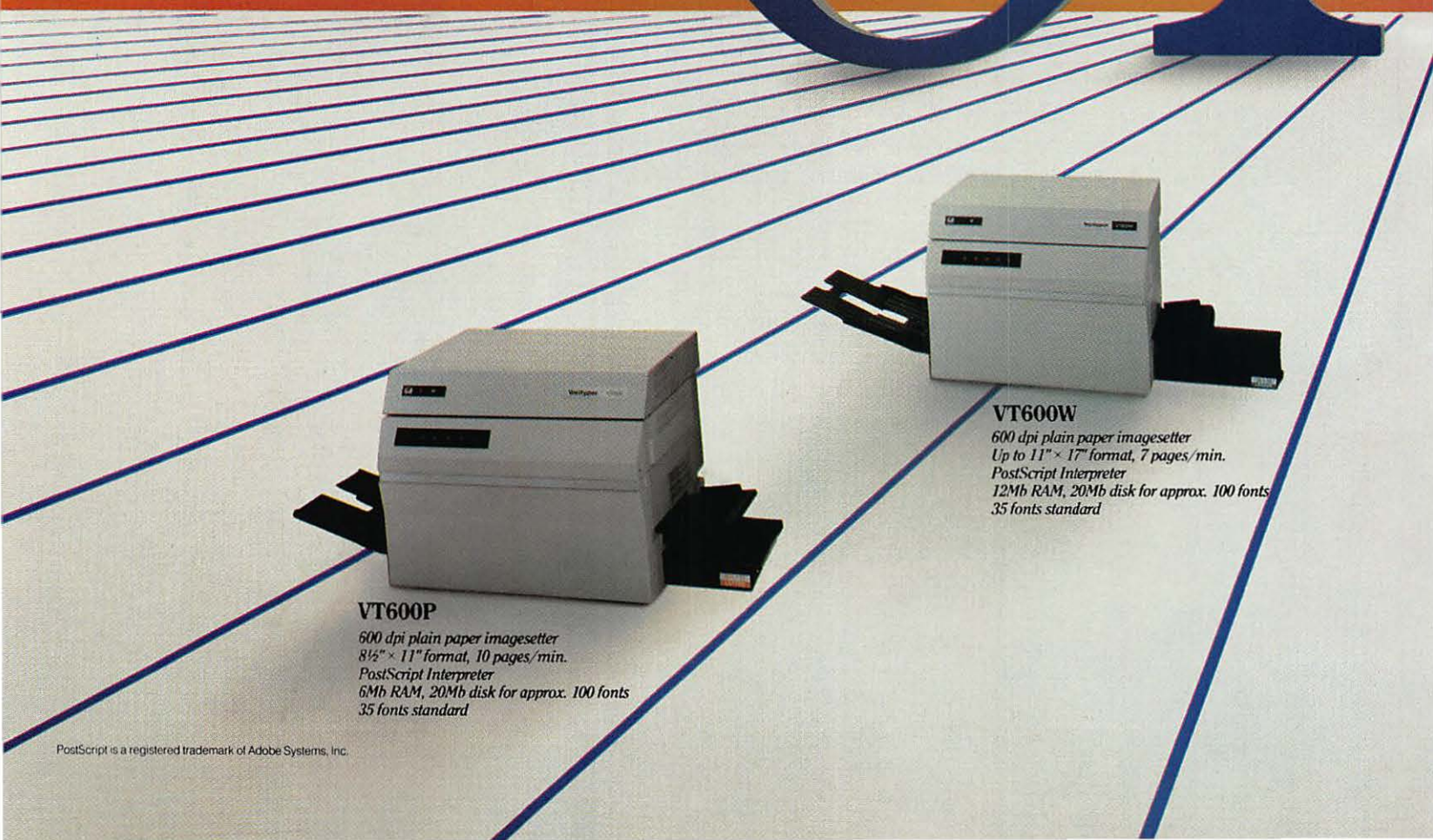
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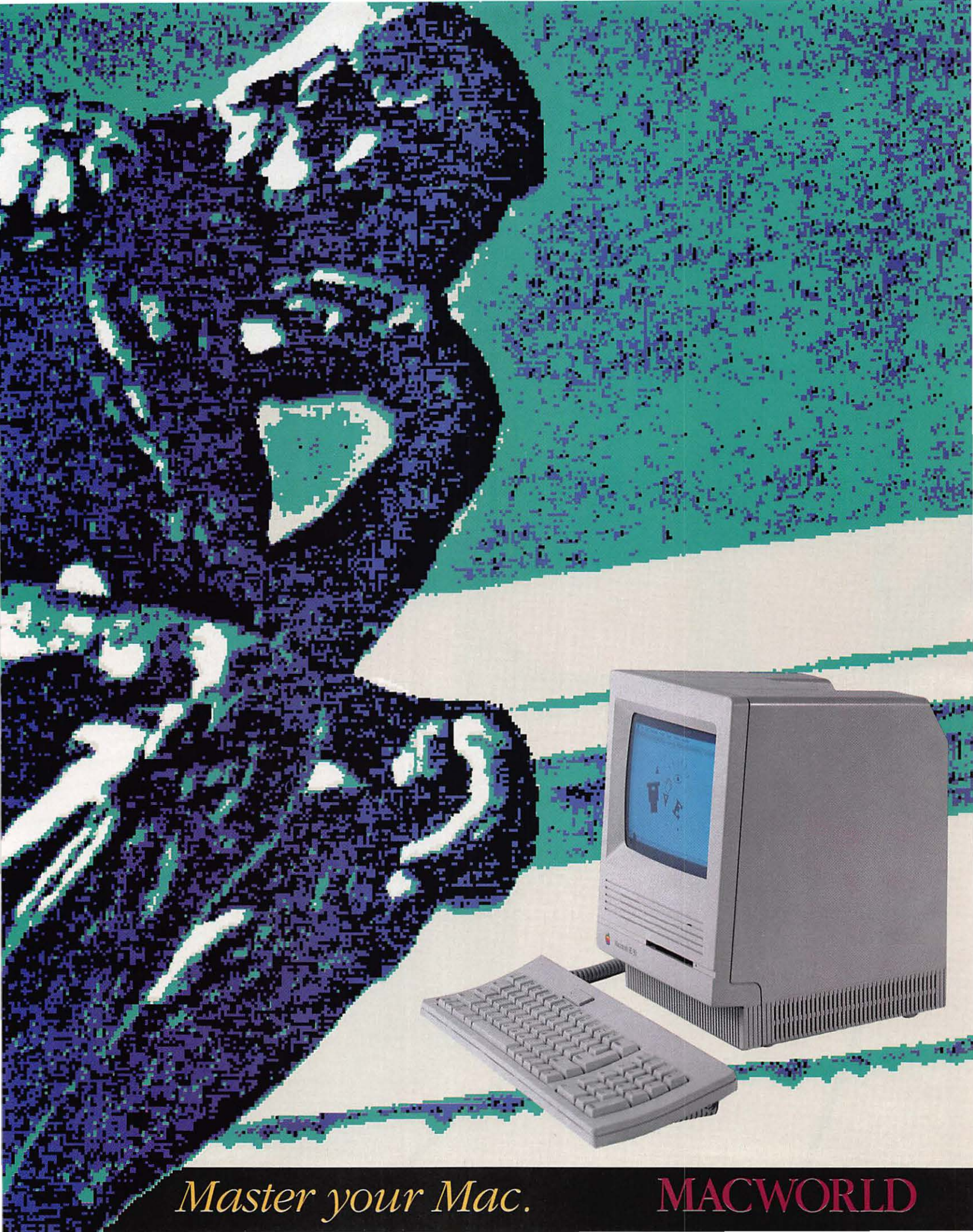


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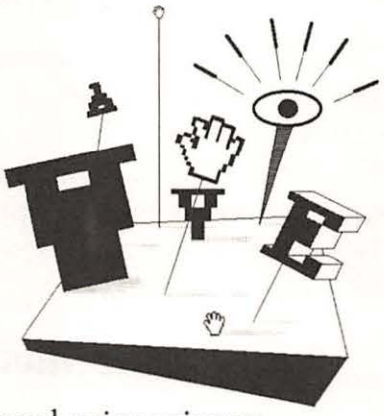
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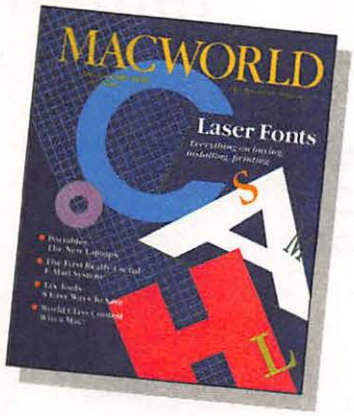
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You have until March, 1990 to create your own Mac Masterpiece. The winners will choose from a top-notch assortment of hardware and software donated by contest sponsors. For more information on the **Macintosh Masters Contest,** write to:

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Senior production editor Luis Camus and production editor Annie Jenkel inspect Linotronic film for an illustration. About 40 percent of the magazine bypasses the board stage and goes directly to film.

each of these machines. And printers! Pulling page and illustration proofs has two LaserWriter NTX printers going full-time. Don't forget the 9600-baud modem to transmit files to Krishna. And a third AppleShare file server for editorial production (art and editorial already had servers) brings total server storage to 600MB of centralized hard disk storage. A QMS ColorScript printer is an aid to color illustration and design.

EXPENSE

So, are we saving any money? To be honest, the impetus for this effort is rooted in the need to make a magazine our size more timely, not to save money. We can shift printing dates at our large printer in the Midwest only so much if we are to reach subscribers throughout the country by the beginning of the preceding month every four weeks (that is, January issues hit the newsstand the first week of December). Whereas we hope to cut two to three weeks from our production cycle with DTP.

A secondary goal is the recognition that we need to use Macintosh software if we are to write about it competently. Finally, we must be able to hold costs level with older production methods, at least through the introductory period. Then we'll work on cutting costs, and I believe that we will be able to do this.

SO WHAT DO YOU THINK?

As the adage goes, watch what we do, not what we say (or something like that). I did not want to write this column until we had put our desktop publishing plan into action. Having done that, let me tell you that we're just beginning. Keep reading. M

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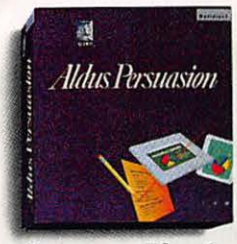
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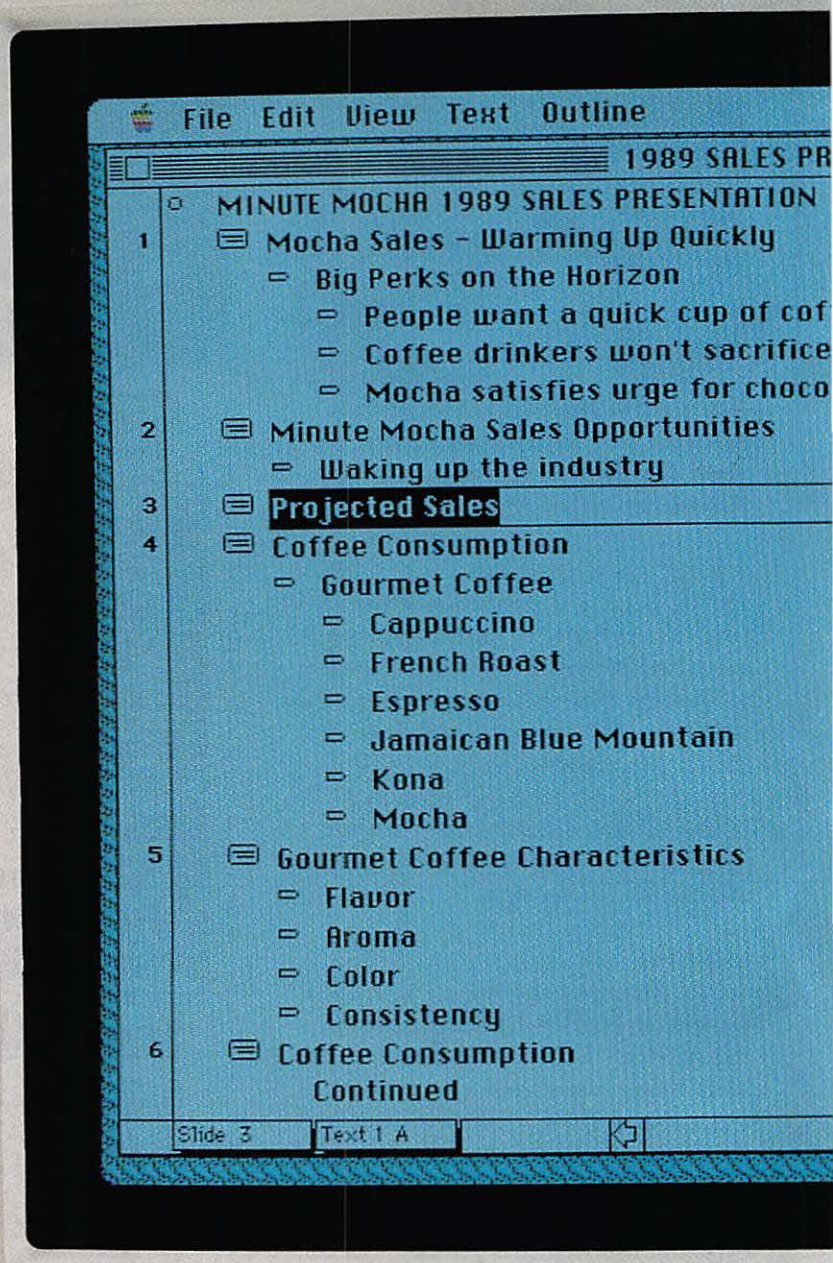
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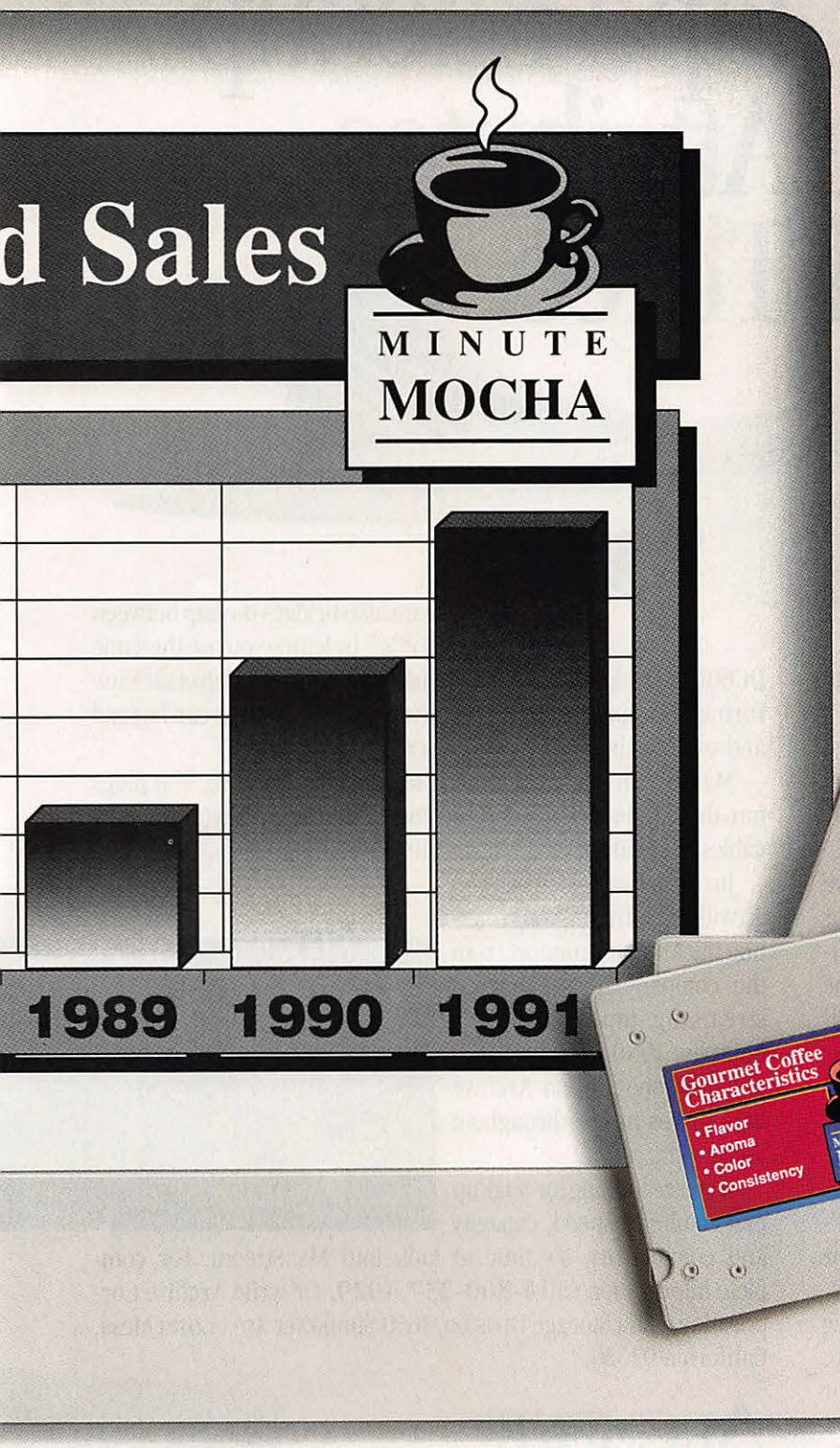
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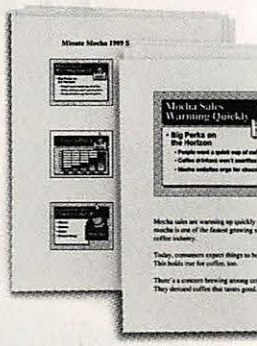


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No wonder the reviewers are applauding Persuasion. According to *InfoWorld*, "This may be the product that does for desktop presentations what PageMaker did for desktop publishing." In its 12/88 Macintosh Ratings Report, *Software Digest* says, "Persuasion provides the best balance of features, usability, and performance to meet the needs of most users."



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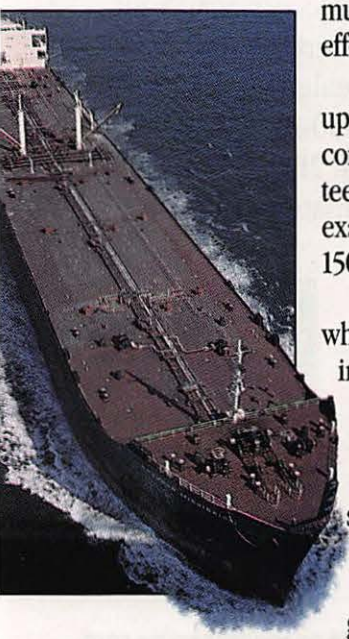
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That's right. MaxStream packs a whopping 150 megabytes on a single industry-standard DC600™ 1/4″ cartridge. With that kind of capacity, it's like a supertanker for data. (There's also a 60 megabytes version for smaller applications.)

Either one is perfect for backing up high-end applications like graphics, imaging, database or CAD programs.

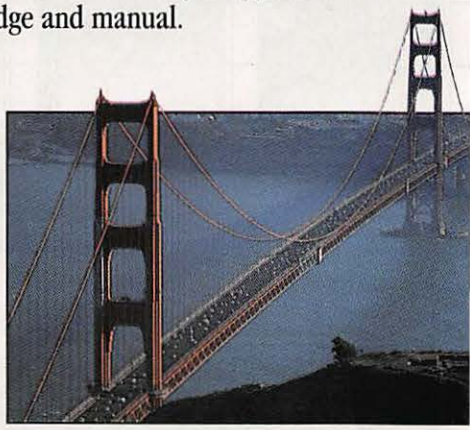
And of course, MaxStream works with every popular network. It's the one drive you can trust for backing up all the valuable data on a server.

LAN administrators will also appreciate MaxStream's software. It lets you back up an entire network at pre-programmed times, instead of having to rely on users to back up their data individually.

Even if you're not on a network you'll like our full array of backup and restore features as well as scripting, which allows for automatic, unattended backups. You can run an entire backup at night, or while you're at lunch.

MaxStream also bridges the gap between Macs and IBM PCs® by letting you use the same DC600 cartridge with both systems. With Archive's Universal Tape Format,™ a tape from one of Archive's tape subsystems can be read and used by the other and vice versa.

MaxStream works with the Mac Plus, SE, II and IIx®. It plugs into the standard SCSI port, and comes with everything you need – cables, software, DC600 cartridge and manual.



Just as important, when you go with MaxStream, you're getting backup and support from the company that pioneered streaming tape technology back in 1980. Today, there are over one-million Archive tape drives in use throughout the world.

If you're looking for backup that combines speed, capacity and connectivity, it's time to look into MaxStream. For complete information call **1-800-237-4929.** Or write Archive Corporation, Data Storage Division, 1650 Sunflower Ave., Costa Mesa, California 92626.

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LETTERS

A Forum for Macworld Readers

Long Live the Revolution

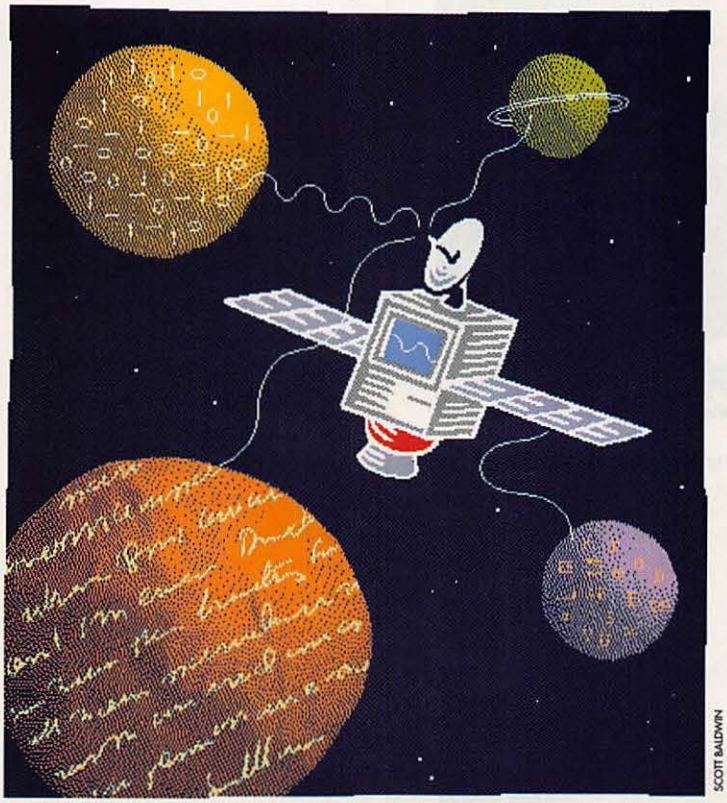
While recently scanning the Macintosh press, I noticed several articles lamenting the lack of any new, revolutionary technology from Apple. I urge these authors, and any users who share this same "technology fixation," to focus instead on the revolutionary uses of the Mac. Speech recognition for the Macintosh is now well into development by Apple as well as by third-party vendors. Apparently, Apple is also experimenting with handwriting recognition and other advances in input technology, all helping to make the Mac the information appliance Steve Jobs envisioned it to be. The Macintosh is providing a platform for new advances in man-computer communications and uses, which I believe—along with the Mac IIx and the 030 SE—to be quite revolutionary in their own right. Now if there could only be a revolution in price . . .

Mark Boudreau
Greenfield Park, Quebec, Canada

A Mac in DOS Clothing

What equipment do I need to run IBM PC software on my Mac SE? I also need a wide-carriage Mac-compatible printer.

Blaine Voss
Newark, Ohio



SCOTT BALDWIN

In our September 1988 Reviews, we covered two products that allow you to run DOS files on an SE: Mac+PC SE ("A Window on DOS") and SoftPC ("Teaching a New Dog Old Tricks"). See May 1988 Reviews ("Apple's Junior Business Printer") for information on the ImageWriter LQ, a wide-carriage printer.—Ed.

An Unworkable Works

I publish two newsletters using Microsoft Works and PageMaker and have been using Works 1.0 and 1.1 since I first obtained my Mac. Then I updated to 2.0 for the columns capability and the spelling checker. That was a big mistake.

In attempting to place word processing files from Works 2.0 into PageMaker 3.01, I got no font transfer and my 24-point headlines were either missing or chopped to the point of uselessness.

A Microsoft representative told me that PageMaker does not accept RTF format for font and file integrity. She also said that if I transferred my Works file into Word, I could then transport it into PageMaker. I do not have Word, and if I did I would not be using Works for the newsletters. The PageMaker manual says one can import Works documents by direct placing. Not so now! Nowhere have I read a warning that Works 2.0 won't export to PageMaker. For my purposes, Microsoft Works 2.0 has fallen far short of utility.

Earl M. Robertson
Rochester, New York

Because PageMaker 3.0 and later versions support neither the Works 2.0 file format nor the RTF export format, the only way to import Works 2.0 files is in text-only format, eliminating all formatting and graphics. At this time, neither Microsoft nor Aldus is planning to correct the problem. For further information on Works 2.0, see Reviews, April 1989.—Ed.

Deft Left Out

We were disappointed that our product, Deft, was not mentioned in your listing of CASE tools for the Macintosh ("CASE Tools for the Mac," *Letters*, January 1989).

(continues)

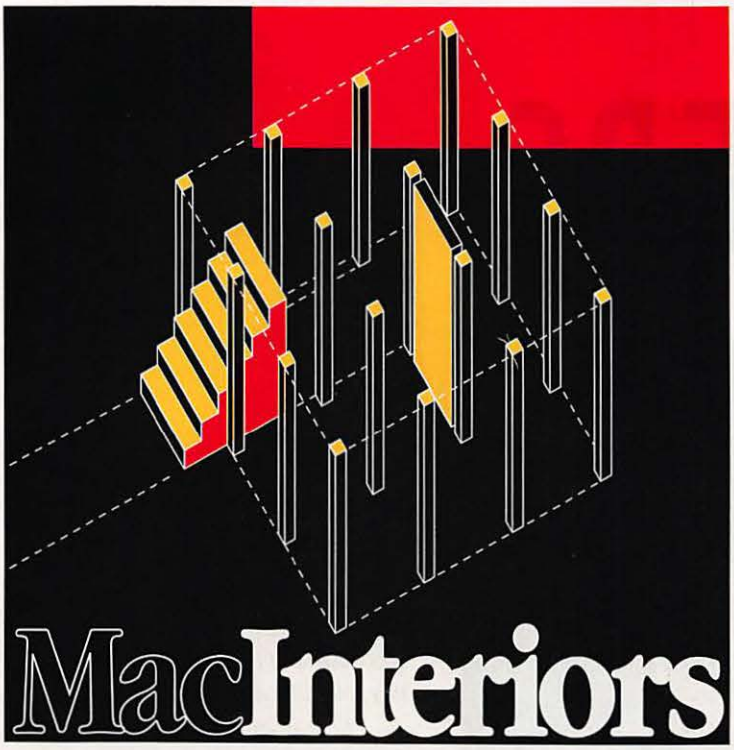
Corrections

Steven Levy's April Iconoclast *column was an April Fool's joke. Our apologies to readers who did not get the gag; any future satires will be clearly labeled as such.*

*The address for STF Technologies, maker of FAXstf (*Where to Buy, *March 1989), is 1817 Main St., P.O. Box 247, Higginsville, MO 64037, 816/584-7727 or 800/426-1679.*

Accountant, Inc. Professional (New Products, *February 1989) is a professional accounting package by Softsync, 212/685-2080.*

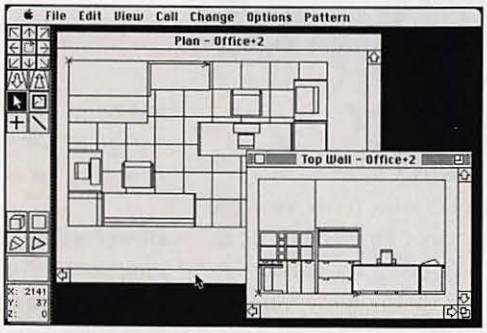
The phone number for Spectrum HoloByte, maker of Tetris for the Mac II (New Products, *March 1989), is 415/522-3584.*



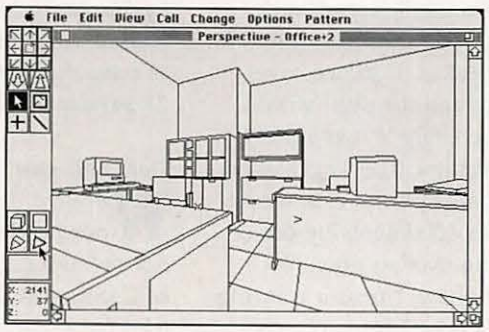
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Deft is a well-established product that covers analysis, design, coding, and documentation—the areas the letter writer was interested in.

Andres Model
Deft Inc.
Rexdale, Ontario, Canada

We regret the unintentional omission.—Ed.

Pros and Cons of SuperStacks

As a part-time HyperCard hacker, I very much enjoyed your SuperStacks contest (November 1988). But I made two disappointing discoveries.

First, you had no category for stacks designed to make financial calculations for business or personal use. For many such computations, HyperCard provides a much better development and user environment than, say, Excel or database applications. I hope you'll consider this as a category for future SuperStacks contests.

Second, Developer Stack did not win its category. I have been using Developer Stack since I began using HyperCard. While it may not be for the true novice, it can be used by anyone developing stacks, even those for personal use. It allows beginners to benefit from the power offered by external commands without the struggle of learning Pascal or C. As such, it is perhaps the most valuable resource tool for someone getting started with scripting.

Tommy Bargeron
Tifton, Georgia

Getting Past First Base

I owned a 128K, then upgraded to a 512K with a HyperDrive, and recently purchased a Mac Plus. That's when my troubles began. None of my 1stBase files were legible, and although I talked to several Apple dealers, none were able to help me. Finally, I determined that I needed a new database, but they were all complicated and didn't really serve my needs. Imagine my delight when, while browsing through *Letters* in the September 1988 issue of *Macworld,* I discovered that 1stBase was now 1stFile. I called 1stDesk Systems, got the update, and retrieved all my lost files dating back to 1984. Best of all, I can now create new files. Just one line in your *Updates* column would have saved me a lot of time and worry.

Mary Lou McClammy
Baker, Oregon

We reviewed 1stFile in our January 1988 issue and covered it again in a June 1988 feature, "Data Basics."—Ed.

Aches and Strains

I'm in the process of moving from a Mac Plus to a Mac II and a large screen, and I need help in selecting the appropriate furniture, screen-suspension hardware, and so forth. I'd love to read an article on selecting computer furniture to minimize headache, backache, neck ache, eye strain, and other maladies related to computer usage. I'm sure such an article would gain a large readership. How about doing one?

Stanley Froud
New York, New York

We do seem to be getting more letters on ergonomics lately (see "Desktop Ergonomics," Letters, November 1988, and "Who Keeps the Books?," Letters, March 1989). As a result, we are planning to cover this issue sometime in the future.—Ed.

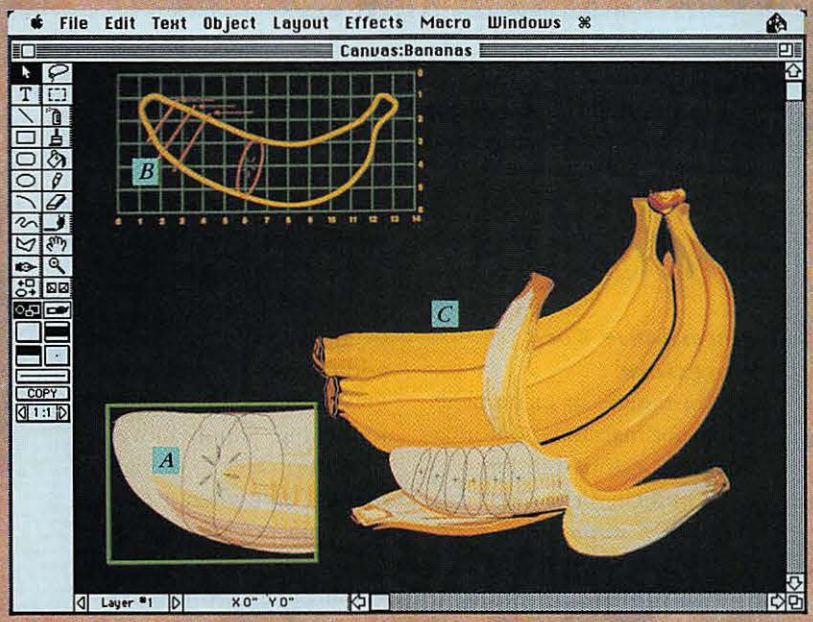
(continues)

A To an architect, fine hairlines like ours are pure poetry.

B Auto-tracing built this banana from a scanned-in produce ad. In split seconds.

C Multi-point bezier curves make drawing a bunch easier. Colors are added in layers.

D Auto-resizing helped this V.P. of Sales display the fruits of his labor, graphically.



E Smooth continuous color blending inspired this art director to new heights.

F What are mere words compared to WYSIWYG text with special effects?

G After he slipped away, we added rich Postscript® gray scales to the gorilla's leftovers.







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These unretouched drawings were created in Canvas 2.0 and output to a Mirrus film printer.

Instant Imaging

Ron Risley's article on color printers ("Printing a Rainbow," January 1989) was interesting, but some of his statements regarding color film recorders sound questionable. He calls Polaroid instant slide film "a hassle to work with" because you must expose an entire roll, then process and mount the slides for viewing. I'm not aware of any slide film that doesn't require this sequence of steps. The Polaroid Instant Slide System allows you to process and mount the film in about five minutes compared to the normal two and a half hours or more it takes for a lab to process conventional E-6 film. There will always be a premium for the speed and convenience of instant imaging, but the advantages far outweigh the slight cost increase, and it surely beats paying at least $13 per slide from a service bureau.

Mark Cross
Northfield, Minnesota

Powerhouse Word Processors

An example of incomplete, if not inaccurate, information can be found in Jim Heid's article, "The Great Write-Off," in the November 1988 issue of *Macworld*. In comparing Microsoft Word, WordPerfect, and FullWrite Professional, he says that "since Word treats any line ending with a hard carriage return as a paragraph, I had to remember to select all the lines in a table before adjusting tabs."

Although that's technically correct (Word does store formatting information with each hard return), he failed to mention that Word provides a new-line feature (Shift-Return) that creates a new line but not a new format. This feature makes it easy to create, and even easier to modify, tables, address blocks, and multiple lines of text with identical formatting. Simply move the I-beam pointer to the left margin, and when it changes to a right pointing arrow, double-click, and the paragraph is selected. QuarkXpress also uses this feature.

I was initially frustrated that Word did not use embedded rulers to indicate a format change. But after becoming familiar with Word's approach of placing formatting information with each paragraph, I came to appreciate this newer concept that eliminates superfluous rulers dividing text.

Joseph T. Broghamer
Munich, West Germany

Since the new line feature applies the same tab formats to every line in the table, it's fine for simple tables whose formats are the same in every line. However, for tables that require different formatting in different lines—such as headings centered over decimal-tab columns, with leader dots in some lines but not in others—it has limited value.—Ed.

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Circle 65 on reader service card

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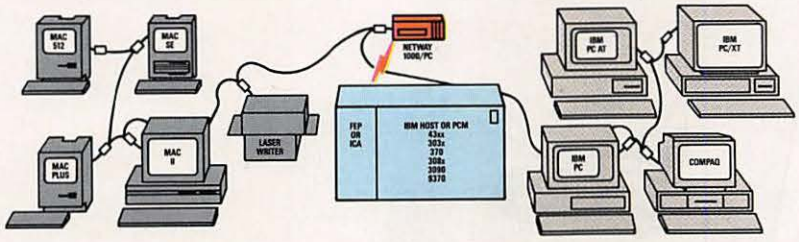
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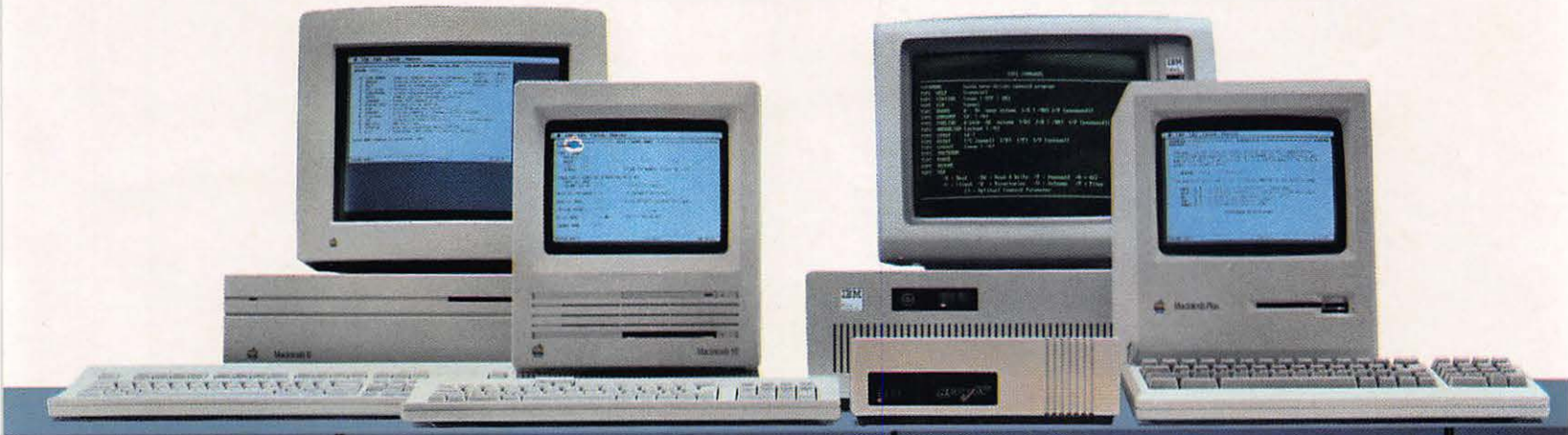
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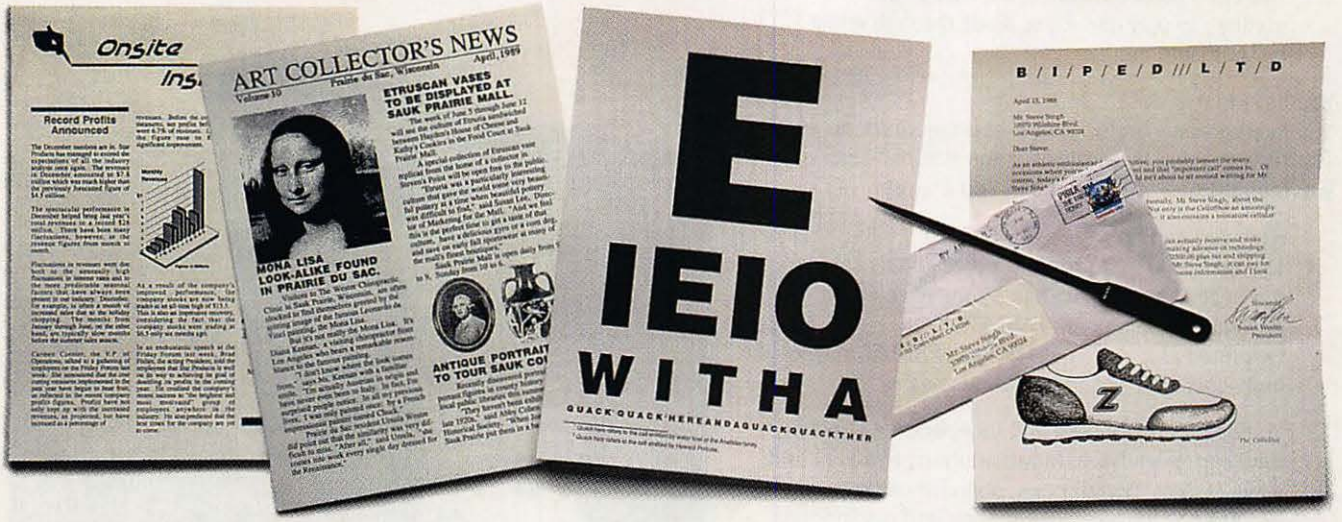
The essential Macintosh word processor.



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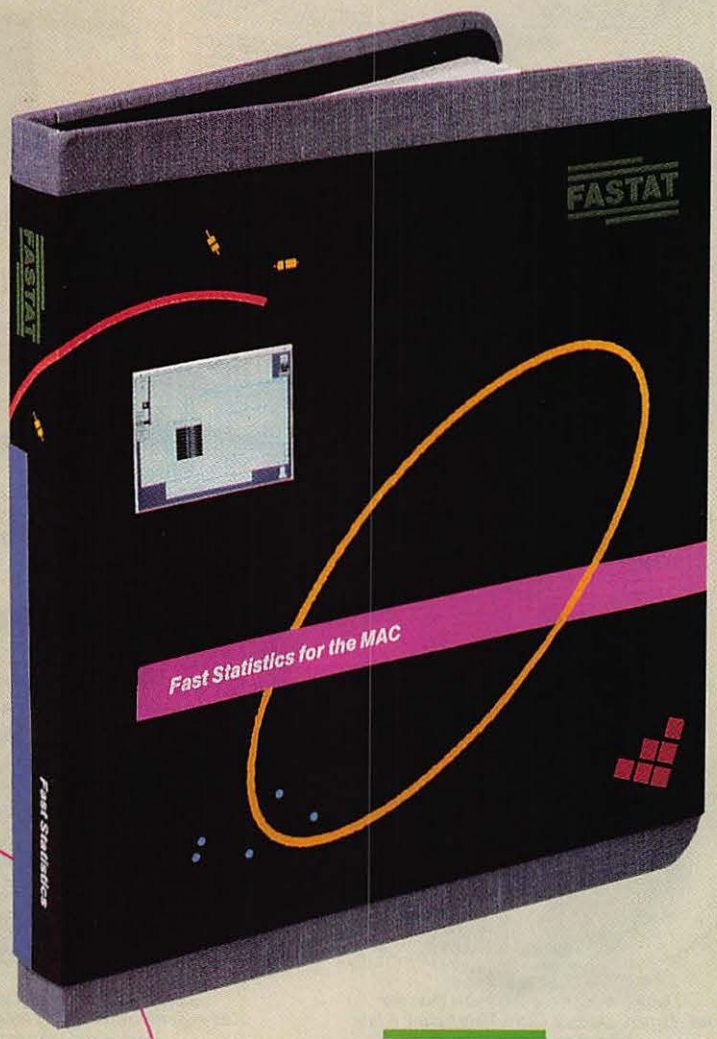
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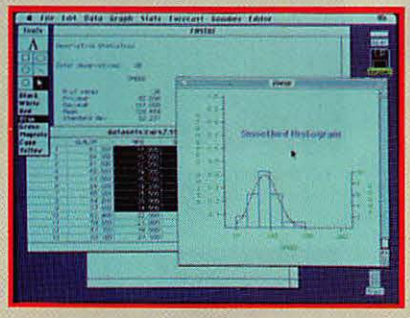
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*MacWeek September 13, 1988
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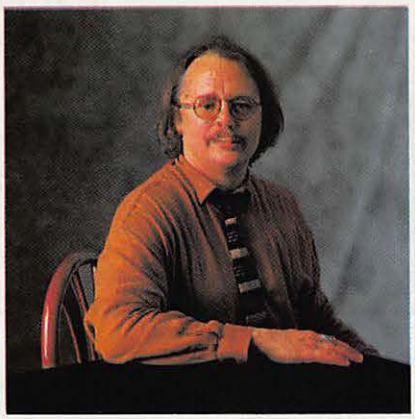
Whither HyperCard?

It's about time we did a reality check on HyperCard

Maybe you attended or read about one of the announcements at a Macworld Expo in which Apple has presented amazing HyperCard tricks—video, animation, sound. So you bought a copy, or got one with a new Mac, and tried it out. It was really neat, but it was missing something. Color? Resizable windows? Stackware?

As with other new Mac toys, after a little while you dragged it into an obscure folder on your desktop and stored the documentation on a remote shelf. From time to time you may have played with HyperCard again, especially when innovative new stacks emerged. There have been a handful of these, along with some commercial products like Business Class and Focal Point from Mediagenics, DTP Advisor from Brøderbund, and Sound Recorder from Farallon. Some have sold well, but apparently HyperCard's initial magical appeal has not extended to selling programs. The most popular related products have been books on how to use HyperCard and developer tools that make programming HyperTalk easier.

HyperTalk has come to replace BASIC as a language for many would-be programmers. HyperCard has been a boon to third-party developers looking for ways to produce interactive demos or training disks for their products. It has been used to produce some indispensable personal applications. The energy and enthusiasm of a new community of Macintosh developers and users has been directed at HyperCard.



However, in the two years since it was announced with great fanfare, HyperCard hasn't changed the world—not even the Mac world. Perhaps HyperCard's least visible but most important attribute is that it has set the stage for further software developments.

For example, Silicon Beach has SuperCard, and Format has Plus. We are seeing multiple, resizable windows in color, improvements in graphics, and a multitude of new features. Hyper-product finally has become mega-product. Applications are blending, and user interface and application distinctions are lessening.

When Bill Appleton wrote Symmetry's Hyper DA, there were furrowed brows and much talk of intellectual property theft from Apple's HyperCard group. Why the worry? Hyper DA allows us to look at stacks without owning HyperCard. After some discussion back and forth, Symmetry was given dispensation from Apple to publish its product without litigation. And as the second wave of HyperCard products comes along, there is hardly a whisper from Apple. Products that open stacks, use HyperTalk, read XCMDs, and expand upon the concepts proposed in HyperCard are flourishing.

The objections Apple has raised about Symmetry and other programs borrowing HyperCard's look and feel do have some merit. Thorny issues abound. Can HyperTalk, the programming language, be patented? Can algorithms within HyperCard, such as those used to search databases, be copyrighted? What about the ability to patent HyperCard's encoding and decoding techniques for reading bitmaps? At present, Apple doesn't appear to be preparing for combat with either Silicon Beach or Format.

In fact, the company seems to have developed an enlightened approach to new products that will compete directly with HyperCard, and may also be putting more into HyperCard's future development. It is clear that Apple wants to provide users and developers with tools for working in multimedia environments. I also expect we'll see benchmark demonstrations (à la MacPaint) that will show us how and for what additional purposes HyperCard technology can be used.

Some ideas are made manifest through sheer effort, like developing the original Macintosh. Other ideas come about as a result of some character flying a kite in a storm. One of these days we'll realize that HyperCard developer Bill Atkinson was a kite-flyer. The next step is to find an Edison to formalize his scheme and turn it into a salable product. M

Programs Plus

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Reports for Hypercard	75.	**Microsoft** Microsoft File 2.0	129.
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HyperCard	42.	GeoQuery	199.
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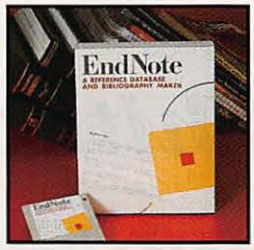
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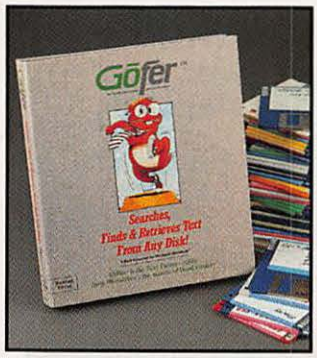
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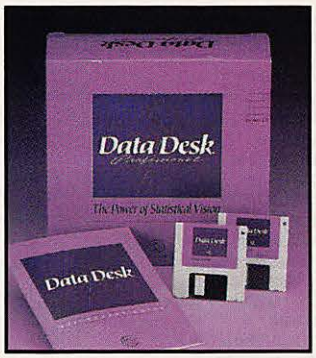
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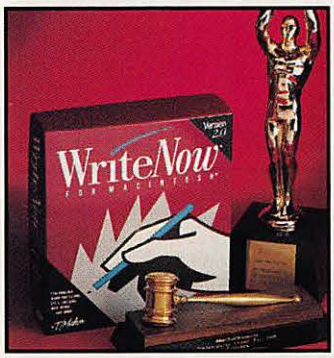


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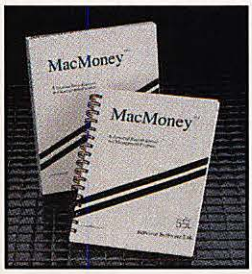


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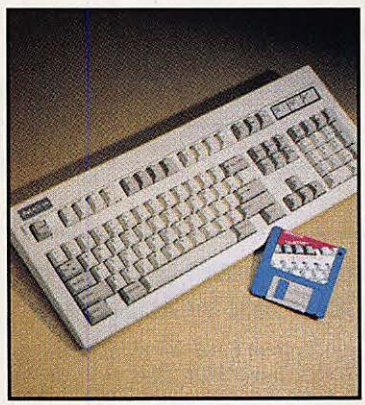


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MacPac 2400E w/software & cable	179.
Best Data Products SmartOne 2400/1200 w/software & cable	169.
Epic Epic 2400 Int. SE	315.
Epic 2400 Int. Mac II	315.
Hayes Microcomputing	
Smartmodem 1200	299.
Smartmodem 2400	449.
Practical Peripherals	
Practical Modem Mini 1200SA	79.
Practical Modem 2400SA	181.
MacCommpack *(2400SA w/Microphone & Cable)*	***Special*** 229.
Prometheus	
Promodem 2400M Ext. *(Software & Cable)*	199.
Supra Corporation	
Supra Modem 2400	149.
U.S. Robotics	
Courier 1200 *(Hayes Compatible)*	199.
Courier 2400 *(Hayes Compatible)*	349.



MAC-101 Keyboard by DataDesk

Replace your Mac's keyboard with the ***MAC-101*** by DataDesk. The positive tactile, firm feel 101 includes a full numeric keypad, 15 function keys, 6 page control keys, and a T-style cursor pad. Includes 101-Keys desk accessory software, a powerful macro utility that allows you to exploit the full power of the function keys in almost any Mac application. Available in ADB and non-ADB versions. **$145.**

PROGRAMS PLUS

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FAX 203/381-9043
Customer Service 203/378-3662
800/832-3201

Programs Plus



DeskPaint 2.0 & ZBasic 5.0 by ZEDCOR, Inc.

DeskPaint 2.0 is a powerful desk accessory that creates, loads, edits and saves bitmap graphics including TIFF, MacPaint and PICT formats. *DeskPaint 2.0's* features include: Auto Trace, Air Brush, Distortion, perspective control and more **($69)**. ***ZBasic 5.0*** is an interactive basic compiler with all the tools needed to help serious Mac programmers create applications. *ZBasic 5.0* includes color and full toolbox support, an MSBASIC conversion utility and more **($99)**.

ACCOUNTING PACKAGES

Aatrix Software		**Layered**	
Aatrix TimeMinder	109.	Insight One Write	185.
Aatrix Payroll Plus	159.	Insight Expert GL, AR, or AP	455.
Bedford Software		**MECA**	
Simply Accounting	219.	Managing Your Money	127.
Chang Labs		**Monogram**	
Rags to Riches Gen. 3-Pak 3.1 (GL/AR/AP)	289.	Business Sense	279.
Rags to Riches GL, AR, or AP	119.	Dollars & $ense 4.0	81.
Dac Software		**Peachtree**	
Dac-Easy Light	44.	Back To Basics Professional (GL/AR/AP/INV)	159.
Intuit		**Survivor Software**	
Quicken	***Special*** 33.	MacMoney 3.0 *(En. Ver.)*	***Special*** 62.

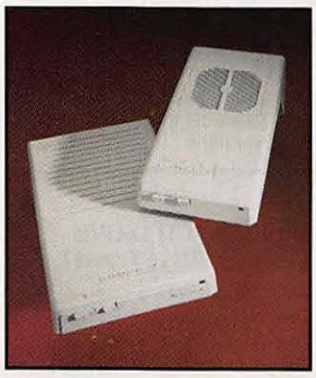
MacGolf Classic by Practical Computer Applications, Inc.



MacGolf Classic puts you into a full perspective 3-D simulation of the most vivid, stimulating golf action on any computer. With beautiful 16 color graphics on the Macintosh II. **$54.**

COMMUNICATION SOFTWARE

Compuserve		**Insigna** SoftPC	409.
Compuserve Starter Kit	24.	**Software Ventures**	
Compuserve Navigator	45.	Microphone II *(Includes Glue)*	225.
DataViz		**Solutions, International**	
MacLink Plus with Cable	145.	BackFax	129.
Freesoft		**Synergy Software** VersaTerm	65.
Red Ryder V10.3	54.	VersaTerm-Pro	195.
Hayes		**Traveling Software**	
Smartcom II 3.0	88.	LAP-LINK	84.



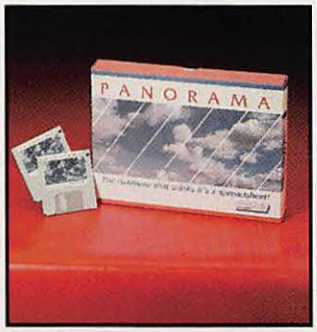
System Saver SE, System Saver Mac by Kensington

The ***System Saver SE ($55)***, and the ***System Saver Mac ($64)*** are the perfect power control accessories for the Mac SE and the Macintosh. Kensington *System Savers* provide outlets for two peripherals and replaces your Mac's power cord. Surge suppression and noise filtering protect your Mac from any disturbances on the power line. The System Saver Mac also includes a cooling fan, and is available in beige or platinum.

GRAPHICS SOFTWARE

3G Graphics		**Innovative Data Design**	
Images w/Impact Graphics & Symbols	59.	Dreams	279.
Images w/Impact Business 1	69.	MacDraft 1.2B	149.
ABA Software		**Laserware** Laserpaint Color II	359.
Draw It Again Sam 2.0	79.	**Letraset**	
Graphist Paint II	289.	ImageStudio 1.5	275.
Adobe Systems		**Micro Illusions**	
Adobe Illustrator *88*	309.	Photon Paint	179.
Adobe Fonts *(Various volumes)*	Call	**Micro CAD/CAM** MGMStation	685.
Aldus Freehand	349.	**Micro: Maps**	
Altsys Corp. Fontographer 2.2	239.	MacAtlas Paint 2.0 *(MacPaint Format)*	45.
FONTastic Plus 2.0 or KeyMaster	54.	MacAtlas Hyper Atlas	64.
Ashton Tate Full Paint	69.	MacAtlas Professional (PICT/MacDraw Version)	129.
Broderbund		**Microsoft**	
Print Shop or Clip Charts	36.	Microsoft PowerPoint 2.1	255.
Drawing Tables	78.	**Miles Computing**	
CE Software Calendar Maker 3.1	27.	Mac the Ripper or Orchestra of Fonts	32.
Claris MacPaint II	102.	People, Places-Things or Taking Care of Business	32.
MacDraw II	309.		
Claris Cad	639.		

Panorama by ProVUE Development



Panorama combines the speed and simplicity of a spread sheet with powerful forms capabilities. *Panorama's* spread sheet structure is spectacularly fast and is easy to understand, and use. *Panorama* sorts, analyzes, categorizes, calculates and charts faster than the blink of an eye. *Panorama* is the database that thinks its a spread sheet! **$209.**

Cricket Software Cricket Draw	169.	**NuEquation** Nu Paint	99.
Cricket Paint	99.	**Olduvai Software**	
Pictograph	89.	Art Clip or ArtFonts 1, 2 or 3	59.
Cricket Graph	119.	**Paracomp** Swivel 3D	249.
Cricket Presents	289.	**Silicon Beach Software**	
Deneba Software Canvas 2.0 (Includes Desk Accessory)	***Special*** 159.	SuperPaint 2.0	129.
Dream Maker		Digital Darkroom	169.
MacGallery *(Hypercard or Paint)*	28.	Super 3D	179.
Cliptures	95.	**Solutions International**	
Dubl-Click Software		The Curator *(Catalog Your Art)*	79.
World Class Fonts: Various Vol. 1-6 *(ea)*	45.	**Springboard**	
WetPaint: Various Vol. 1-16 *(ea)*	45.	Certificate Maker	24.
Electronic Arts Studio 8 *(MacII)*	319.	Springboard Publisher	109.
Enabling Technology		**SuperMac Software**	
Clip 3D *(ea)*	***Special*** 69.	Pixel Paint 2.0	***Special*** 199.
Foundation Publishing		**Symmetry**	
Comic People	25.	Picture Base & Wet Paint Bundle	95.
Comic Strip Factory	44.	**Synergy** KaleidaGraph	120.
Generic Software		**T/Maker** Click Art Letters I, Letters II, Personal Graphics, Effects, Business Image, or Holidays *(each)*	28.
Generic CADD	***Special*** 85.	Christian Images	35.
Graphsoft Mini Cad 4.0	375.	Click Art EPS Illustrations	75.
Mini Cad +	520.	**Zedcor** DeskPaint 2.0	***Special*** 69.
Informix Wingz	275.		



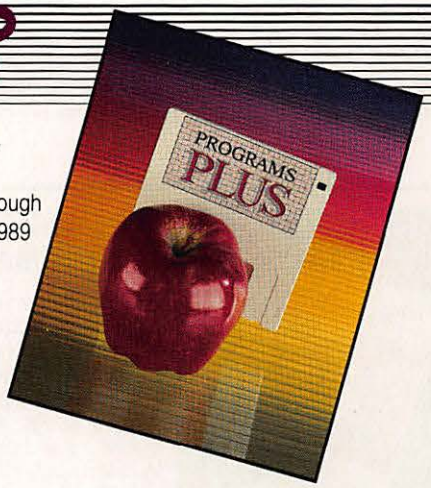
Grappler LS by Orange Micro

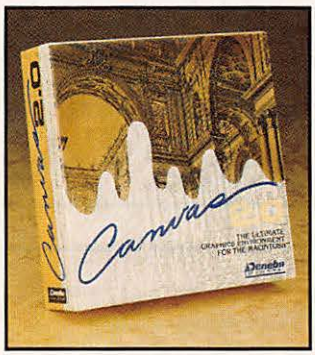
With ***Grappler LS***, you can connect your Mac to HP compatible laser and Deskjet printers, and emulate the Apple ImageWriter LQ. To eliminate waiting time, a powerful spooler is provided with the *Grappler LS* **$92.**

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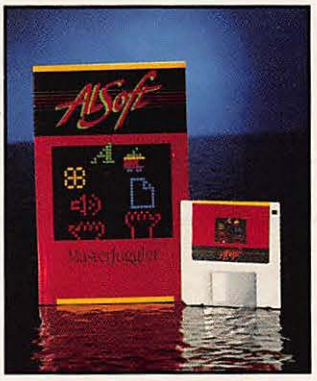


Canvas 2.0 by Deneba Software

Canvas 2.0, one of the top graphics programs, includes many new features: unlimited layers, positioning to 1/64,000 inch, Bezier curves and polygons, and 16.7 million colors on the Mac II. Converts but mapped images into objects. *Canvas 2.0* rivals CAD programs. For business graphics, presentations, desktop publishing, engineering or architecture, *Canvas 2.0* helps you create. **$159.**

LANGUAGES

Borland		**Smethers & Barnes**	
Turbo Pascal	68.	Prototyper	72.
Consulair		**Symantec** Lightspeed C	135.
Mac 68000 Dev. System	59.	Lightspeed Pascal	95.
Manx		Just Enough Pascal	55.
Aztec C	65.	**T.M.L.**	
Aztec C + SDB	99.	TML Pascal II V3.0	115.
Axtec C + MPW	99.	TML Source Code Library II	42.
Microsoft		**Zedcore**	
Quick Basic	69.	ZBasic 5.0	***Special*** 99.

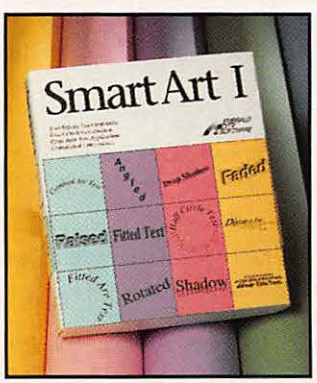


MasterJuggler by Alsoft

MasterJuggler by Alsoft is the utility with the expertise to provide comprehensive management of fonts, DA's, FKeys, sounds, applications, windows, and sound play. *MasterJuggler* lets you open applications and documents without returning to the finder, open multiple applications and files with a single command, switch between open applications via a pop-up menu under Multifinder, and much, much more. **$64.**

BLANK MEDIA

Single Sided 3½" Diskettes		Centech 3½" DS/DD Color Disks *(10)*	19.
Bulk *(Sony)* 3½" SS/DD Disks *(10)*	14.	Sony 3½" DS/DD Disks *(box of 10)*	18.
Sony 3½" SS/DD Disks *(box of 10)*	16.	Fuji 3½" DS/DD Disks *(box of 10)*	19.
Double Sided 3½" Diskettes		Maxell 3½" DS/DD Disks *(box of 10)*	19.
BASF 3½" DS/DD *(box of 10)*	17.	Verbatim 3½" DS/DD Disks *(box of 10)*	19.
Bulk *(Sony)* 3½" DS/DD *(10)*	17.	3M 3½" DS/DD Disks *(box of 10)*	20.



Smart Art by Emerald City Software

Smart Art from Emerald City Software brings custom text effects to your favorite word processor, page layout or presentation program. With *Smart Art* you simply select one of the pre-programmed effects, customize it with the powerful, but simple controls, and place it in your document. *Smart Art* comes with the fifteen most wanted text effects for a word processor, desktop publishing and graphics design. **$95.**



Mac Commpack 2400 by Practical Peripherals

The ***Mac Commpack 2400*** package contains all you need to start high speed telecommunications now. The *Mac Commpack 2400* includes a Practical Modem 2400 SA, Microphone 1.0 software and cables to connect the modem to any Mac. **$229.**

WORD PROCESSORS & DESKTOP PUBLISHING

Access Technology		Letra Studio	289.
Mind Write 2.0	95.	LetraFonts *(Various Vol. 1-45 ea.)*	65.
Mind Write Express	145.	**Microsoft**	
Aegis Showcase F/X	***Special*** 199.	Microsoft Word 4.0	255.
Allan Bonadio Associates		**Preferred Publishers**	
Expressionist 2.0	79.	Vantage	59.
Aldus Corporation		**Quark, Inc.**	
Aldus Persuasion	389.	QuarkXPress V2.0	499.
PageMaker 3.0	399.	QuarkStyle	199.
Ashton Tate		**Symantec** More II	225.
FullWrite Professional	269.	**Symmetry**	
Broderbund		Acta Advantage	65.
DTP Advisor	47.	**T/Maker Company**	
Caere Omnipage	565.	WriteNow V2.0	***Special*** 109.
Claris MacWrite 5.0	102.	**Word Perfect Corporation**	
Emerald City Smart Art	***Special*** 95.	Word Perfect	185.
Letraset		**Working Software**	
Ready, Set, Go! 4.5	275.	QuickLetter	75.

AffiniFile & Tempo II by Affinity



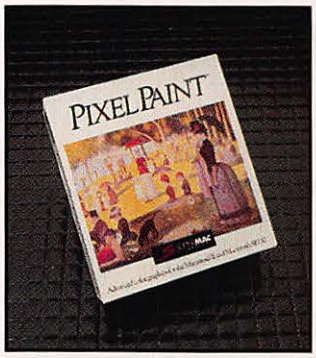
AffiniFile helps you keep notes, store graphics, and find information quickly, starting with an automatic index! This powerful desk accessory files your notes and graphics by topic or subtopic **($46)**. ***Tempo II*** automates your Macintosh to save you time and effort. *Tempo II* can record a series of keystrokes and/or mouse clicks, and turn them into a single key code, ready for instant use **($89)**.

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PixelPaint 2.0 by SUPERMAC Technology

PixelPaint, the first and best selling color paint program for Macintosh color systems has now been enhanced. ***PixelPaint 2.0*** is equipped with a new set of powerful features for graphic design, illustration, desktop publishing and color pre-press work. With *PixelPaint's* intuitive, transparent user interface, sophisticated color images can be created by professional or beginning artists. ... **$199.**



Virex by HJC Software

Virex solves the threat of Macintosh computer viruses. *Virex* detects and repairs infected programs and files. *Virex* will safely eradicate an existing virus or protect against infection. Easy to use, *Virex* will be updated to combat new viruses. **$69.**

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ACCESSORIES

Abaton ProPoint *(ADB Mouse for Mac SE & Mac II)* 89.
CH Products Mirage: Quad or ADB *(Turns Joystick Into Mouse)* 39.
Mach IV Plus: Quad or ADB 65.
Cutting Edge
Cutting Edge MCK-105QK Keyboard w/Quickeys 149.
DataDesk
MAC-101 Keyboard/Beige *(128k/512k & MacPlus)* ***Special*** 145.
MAC-101 ADB Keyboard/Platinum *(Mac SE & Mac II)* ***Special*** 145.
Ergotron
Mousecleaner 360° 15.
MacTilt *(Mac, SE or II)* 68.
Farallon
MacRecorder Sound System *(Mac SE or Mac II)* 139.
Goldstein & Blair
Macintosh Bible 2nd ed. 20.
Impulse
Audio Digitizer w/soundware 139.
I/O Design
Mac Luggage in Navy or Plat.
Macinware Plus Carrying Case 64.
Macinware SE Carrying Case 75.
Imageware II Carrying Case 49.
HDware *(Hard Disk Case)* 49.
Kalmar Designs
Teakwood Roll-Top Disk Cases:
Micro Cabinet *(holds 45 disks)* 14.
Double Micro Cabinet *(holds 90 disks)* 21.
Triple Micro Cabinet *(holds 135 disks)* 31.
Kensington
Mouseway *(Mousepad)* 8.
ImageWriter or ImageWriter II Cover 9.
Macintosh Plus/SE Dust Cover 9.
Tilt/Swivel 22.
Apple Security Kit 34.
Antiglare Polarizing Filter 33.
Mac II Stand and Cable Kit 65.
Power Tree Surge Suppressors (10, 20, or 50) Call
Printer Muffler Stand *(80 & 132)* 24.
Printer Muffler 80 43.
System Saver Mac *(Beige or Platinum)* ***Special*** 64.
Super Base 34.
System Saver SE ***Special*** 55.
Masterpiece Mac II 105.
New Turbo Mouse *(Reg. or ADB)* 119.
Universal Copy Stand 22.
Universal Printer Stand 15.
Lynx Computer
Turbo Trackball *(Mac & Mac+ or Mac SE & Mac II)* 69.
Mobius
Fanny Mac QT *(Beige or Platinum)* 60.
Mouse Systems
A+ Mouse *(MacPlus)* ***Special*** 65.
A+ ADB Mouse *(Mac SE/Mac II)* ***Special*** 85.
Moustrak
MousePad 7"x9" Size 8.
MousePad 9"x11" Size 9.
Orange Micro
Grappler Spooler 39.
Grappler C/Mac/GS or Alphabits 79.
Grappler L/Q or Grappler L/S ***Special*** 92.
Ribbons
Available in Black, Blue, Brown, Green, Orange, Purple, Red, Yellow, Silver & Gold
ImageWriter Ribbon 4.
ImageWriter Black 6-pack 20.
ImageWriter Rainbow Pack *(6 Colors)* 20.
ImageWriter II-Four Color Ribbon 9.
ImageWriter LQ Black 17.
ImageWriter LQ Four Color 20.
Seikosha Ribbon Black 6.
Silicon Comforts
MacChimney *(Very Effective Cardboard Laminate Convection Cooling Device)* 16.
Targus
Imagewriter II Carry Case Blk. 49.
Macintosh Plus Carry Case Blk. 59.
Deluxe MacPlus-XKB Blk. ***Special*** 69.

LightningScan by Thunderware



LightningScan is a hand-held, high resolution image scanner for the Macintosh. Its design allows fast scanning of photographs, images from books and magazines, drawings, and logos. Its speed and flexibility make it an ideal tool for all Macintosh graphic applications including desktop publishing and design. After use, the scanning unit is easily stored in any desk drawer. **$409.**

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★ VISA and MASTERCARD accepted. No surcharge.
★ Your credit card is not charged until we ship.
★ If we must ship a partial order, the shipment that completes the order is sent freight free.
★ All shipments insured; no additional charge.
★ Upon receipt and approval, personal and company checks now clear the same day for immediate shipment.
★ No sales tax except orders shipped within CT, add 7.5% tax.
★ 120 day limited warranty on all products. Defective software replaced immediately. Defective hardware repaired or replaced at our discretion. Prices subject to change without notice. All items subject to availability.
★ Call us anytime Monday thru Friday 9:00 to 9:00 Eastern Time, or Saturday 9:00 to 6:00 Eastern Time. You can call our business offices Monday thru Friday 9:00 to 5:30 Eastern Time at (203)375-3560.
★ Purchase Orders accepted at our discretion, for more information call (203)378-1926, 9:00 to 5:30 Eastern Time.

SHIPPING

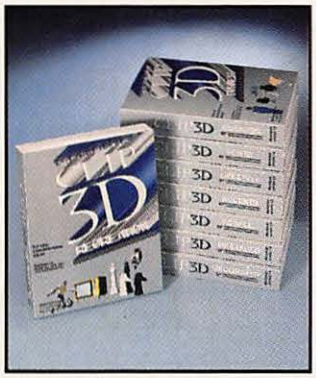
★ **Continental U.S.**; Add $3.00 per order to cover Airborne Express Overnight, unless UPS ground delivers next day. Some areas require an additional day.
★ All (instock items) ordered by 5:00PM Eastern Time Monday thru Friday will ship that evening. Barring computer failures or other catastrophes.
★ **Alaska, Hawaii, outside Continental U.S.**, APO and FPO; call (203)378-3662 or write for shipping information.
★ Mail-in orders (especially from foreign countries), please furnish telephone or fax number.



Cutting Edge 800K Drive by Cutting Edge

The ***Cutting Edge 800K*** floppy disk drive takes advantage of the newest technology to offer high speed, low noise, high reliability in a compact, stylish case. The *Cutting Edge 800K* floppy drive is compatible with all new ROM Macs including the Mac SE and Mac II. The *Cutting Edge 800K* would make an attractive addition to many Macs. **$175.**

Overnight $3



Clip 3D Art Library & Clip Program by Enabling Tech

Clip 3D Art Libraries allow you to add exciting, full color, 3-D clip art to your desktop publishing, presentation, painting and drawing programs. Available library volumes include: Fonts, Massages, People, Lifestyle, Business, Recreation, Geography and Accents. A *FREE* ***Clip 3D*** program is included with each library, and allows you to rotate art, vary perspective, change size and proportions, and adjust lighting. **$69.**

DISK DRIVES/HARD DISKS/UPGRADES

1 Meg SIMMS	Call
AST Research Mac 86 Co-Processor	419.
Mac286 Co-Processor *(Mac II)*	1069.
CMS	
SD Ser. MacStack SD20 *(Mac+/SE/II)*	569.
SD Ser. MacStack SD30 *(Mac+/SE/II)*	615.
SD Ser. MacStack SD43 *(Mac+/SE/II)*	789.
Cutting Edge	
Cutting Edge 800k Drive	***Special*** 175.
Cutting Edge Wedge XL 30 Plus SCSI Hard Drive	539.
Cutting Edge Wedge XL 45 Plus SCSI Hard Drive	669.
Cutting Edge XL 30 Internal Hard Drive	439.
Cutting Edge XL 45 Internal Hard Drive	585.
MacSnap Plus 2 *(MacPlus to 2MB Non Expandable)*	439.
MacSnap 2SE or 1024 Option *(1MB or MacII Memory Exp.)*	439.
SCSI Interface/Port	109.
MacSnap Toolkit *(torx driver, opener & grounding set)*	15.
Personal Computer Peripherals	
Platinum Color. Optional Built-In Modems.	
MacBottom HD-21 *(20+MB SCSI Hard Disk)*	***Special*** 659.
MacBottom HD-32 *(32MB SCSI Hard Disk)*	***Special*** 699.
MacBottom HD-45 *(45MB SCSI Hard Disk)*	***Special*** 859.



Word Finder by Microlytics, Inc.

With ***Word Finder***, you can put a 220,000 word thesaurus inside your Macintosh. *Word Finder* is a desk accessory that is compatible with most Mac software, including Hypercard and Multifinder, and allows you to call up synonyms in seconds. **$33.**

Dove Computer FastNet Networking	Call
Marathon 030 Accelerator	999.
Marathon 020 Accelerator	
MSE 1 (16 Mhz)	585.
MSE 2 (16 Mhz w/1MB)	979.
MSE 3 (16 Mhz w/Math Co-processor)	779.
MSE 4 (16 Mhz w/1MB & Math Chip)	1159.
MacSnap 524E *(512E to 1MB)*	289.
MacSnap 524S *(512E to 1MB w/SCSI)*	379.
MacSnap 548 *(512K to 2MB)*	459.
MacSnap 548E *(512E to 2MB)*	549.
MacSnap 548S *(512E to 2MB w/SCSI)*	589.
MacBottom HD-70 *(70MB SCSI Hard Disk)*	***Special*** 999.
MacBottom HD 84 *(84 MB SCSI Hard Disk)*	***Special*** 1249.
Rodime Rodime 20 Plus Ext.	615.
Rodime 45 Plus *(Ext. 45MB SCSI)*	909.
Rodime 450RX *(Int. 45MB Mac SE/II)*	829.
Rodime 100 Plus *(Ext. 100MB SCSI)*	1079.
Rodime 140 Plus *(Ext. 140MB SCSI)*	1325.
Rodime 1000 RX *(Int. 100MB MacII)*	1045.
Video Technology	
Laser 800k External Drive	185.

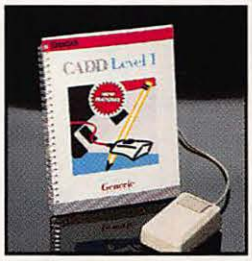


MacBottom Hard Disk Drives by PCPC

The award winning ***MacBottom Hard Disk Drives*** are the perfect compliment for your hard working Macintosh. *MacBottom* drives are available in 21 **($659)**, 32 **($699)**, 45 **($859)**, 70 **($999)** and 84 **($1249)** megabyte models, platinum color, and offer fast average seek times, and high data transfer rates (up to 1500 kilobytes/second) in a low profile case. An optional internal Hayes™ compatible modem is also available.

ENTERTAINMENT SOFTWARE

Access	
World Class Leader Board Golf	30.
Accolade	
Hard Ball or Mean 18	23.
4th & Inches	24.
Activision	
Universal Military Simulator or Manhole	30.
Might and Magic	36.
Artworx	
Bridge 5.0	22.
Broderbund	
Ancient Art of War or At Sea	27.
ShufflePuck Cafe	24.
Poster Maker Plus	36.
Bullseye Software	
P51 Mustang or Ferrari Grand Prix	32.
Casady & Greene, Inc.	
Crystal Quest	26.
Crystal Quest w/Critter Editor	42.
Centron Crapsmaster, Roulettemaster or BlackJack Ace	27.
Pokemaster or Baccaratmaster	27.
MicroPro Pirates	32.
Microsoft	
Flight Simulator 1.02	32.
Micro Sports MSFL Pro Draft	26.
MSFL Pro League Football or 500 Great Teams	32.
Miles Computing Inc.	
Harrier Strike Mission II or The Fool's Errand	32.
Mindscape	
Balance of Power 1990 or Crossword Magic	30.
Deja Vu or Deja Vu II	30.
King Of Chicago, Shadowgate or Joker Poker	30.
Defender of the Crown, Colony or The Uninvited	30.
Practical Computer Applications	
MacGolf or Lunar Rescue	35.
MacCourses	29.
Road Racer	41.
Mac Golf Classics	***Special*** 54.



CADD Level 1 by Generic

CADD Level 1 for the Macintosh is a full featured 2-dimentional design and drafting package for entry level CADD users. *CADD Level 1* is fast, powerful, and easy to learn. Plus *CADD Level 1's* file format allows users to move up to other, more powerful, Generic CADD Level's in the future. **$85.**

Discovery Software Arkanoid	27.
Electronic Arts	
ChessMaster 2100 or Hunt for Red October	32.
Chuck Yeager Flight Simulator or Life & Death	32.
Starfleet I	37.
Scrabble	26.
One-On-One, Pinball Construction Set, Seven Cities of Gold, SkyFox, or Patton vs Rommel	15.
EPYX	
Sub Battle Simulator *(Mac or MacII)*	29.
Hayden Software	
Sargon IV	29.
Infinity Software, LTD.	
Go or GrandSlam Tennis	27.
Infocom	
Leather Goddesses of Phobos	15.
Beyond Zork or HitchHiker's Guide	15.
Zork Trilogy or QuaterStaff	30.
Zork Zero	36.
Primera	
Smash Hit Racquetball II	19.
Sierra On-Line	
Leisure Suit Larry	23.
Space Quest or Space Quest II	29.
Police Quest	29.
Silicon Beach Software	
Dark Castle or Apache Strike	32.
Beyond Dark Castle	32.
Sir-Tech Mac Wizardry	35.
SoftStream, Inc.	
Colour Billiards	35.
Mac Man or Solitaire DA	24.
Sphere, Inc. Tetris	20.
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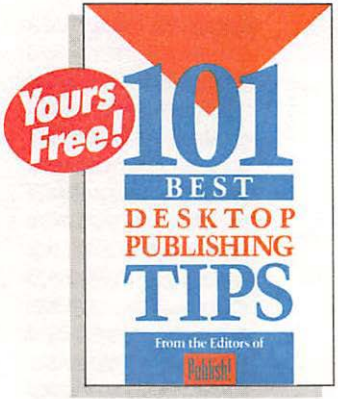
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ART BEAT

by Ann Garrison

In this column we take a peek at the tools and the talent behind Macworld's graphics and discuss the techniques that make them possible.

Artist: Illustrator Ron Chan spends several days a week in a huge, hectic newsroom at the *San Francisco Chronicle.* City desk reporters tap away at their keyboards, and other illustrators and designers labor over drawing tables and computers while Chan sits at a Mac II working on the cover for the paper's weekly TV supplement. When he is not at the *Chronicle,* Chan does illustrations for advertising agencies, design firms, and magazines, including *Macworld.*



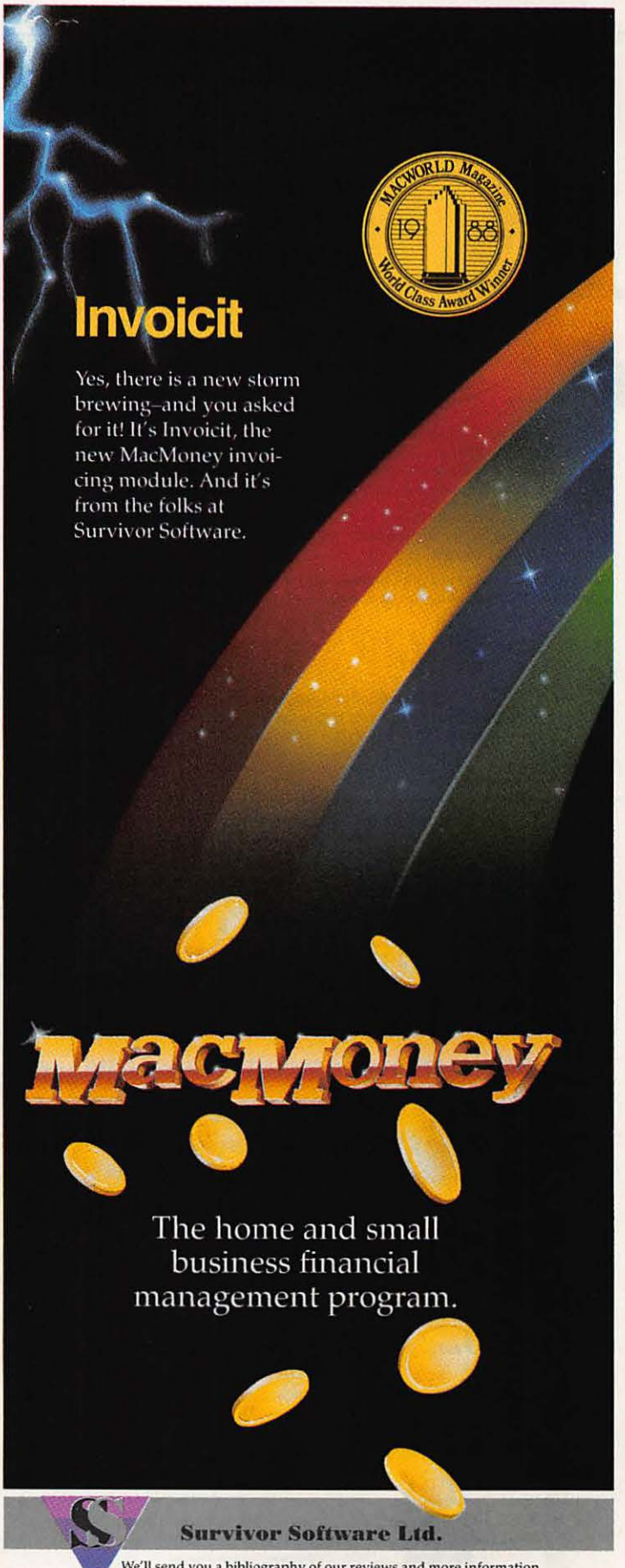
Concept: Our editor-in-chief, Jerry Borrell, asked Chan to design this month's cover, which is especially appropriate for our baptism into desktop publishing. Chan's bold graphics draw heavily on the style and imagery of WPA artists. Though bits and bytes, rather than nuts and bolts, are at the heart of the technology we cover, our editor wanted an image that harked back to the WPA's celebration of the powerful union of men and machinery in factories. Most of us now wear suits, work in cerebral, postindustrial settings, and build up our muscles on Nautilus machines instead of assembly lines, but we still find productive power through union with our machines.

Tools: Macintosh II, Datacopy Model 830 scanner, MacDraw II, and Adobe Illustrator 88.

How It Was Done: Chan spent approximately ten hours at his drawing table creating a black-and-white pencil sketch and coloring it in. The sketch included all the lines and colors in the final cover image. He then scanned a copy of the sketch into a Mac II with a Datacopy 830 scanner. He saved the 7 1/8-inch-by-5 7/8-inch sketch on his hard disk as a TIFF file, which he opened in MacDraw II and proportionally scaled to 9 inches by 10 7/8 inches, the size of a *Macworld* cover. Scanning and resizing took only ten minutes altogether.

Once the sketch had been resized, Chan saved it again as a PICT file and reopened it in Adobe Illustrator 88. When reopened in Illustrator, the sketch appeared as a background template over which

(continues)



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he retraced the original lines.

Chan spent approximately 20 hours tracing and coloring the image in Illustrator. He alternately traced, colored, and added color gradations, working first on the human figure, then on the machinery, and then on the background. He mixed four-color-process colors as he went along, writing down the percentages of cyan, magenta, yellow, and black in each color he used. By reentering the percentages in Illustrator's paint menu, he could reproduce the colors he'd already mixed when he wanted to use them again.

Chan frequently used Illustrator's hiding and locking tools; he would hide a form from view to work on the area surrounding it, and lock a form to avoid grabbing or coloring it. With the masking tool, he was able to lay gradated color, which can only be created in rectangular forms, onto nonrectangular forms.

Chan says that he sees the computer as more of an art tool than an art medium. Because he thinks more like a designer than a painter, he wants to have his entire image planned before moving to the computer. Chan says he likes the creative control of pencil on paper and would not want to draw his original sketch on screen. He wishes that Illustrator 88 had features for more spontaneous, painterly effects, such as the look of a dry wash or the edge of a brush stroke. With more painterly tools, he might have stippled the smoke clouds or created a few rougher edges on the font factory on our cover. M

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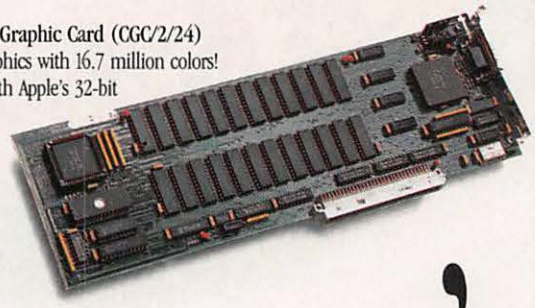
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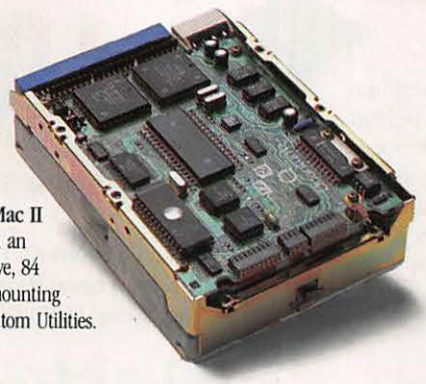
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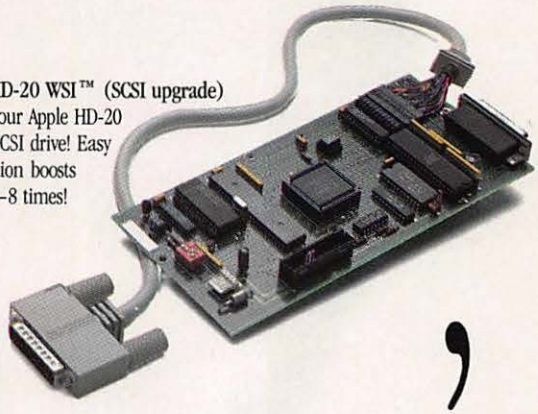
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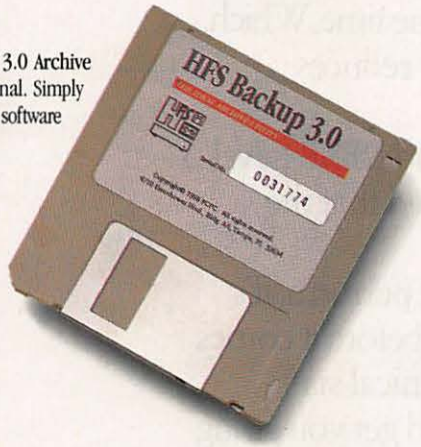


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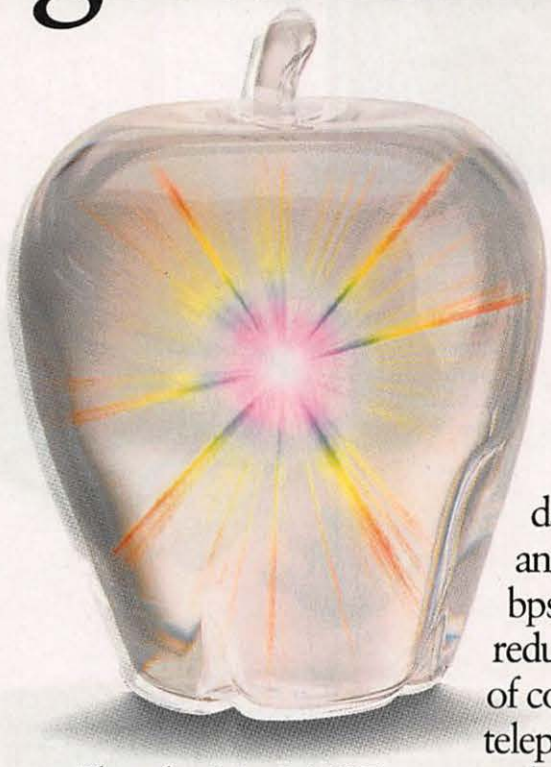
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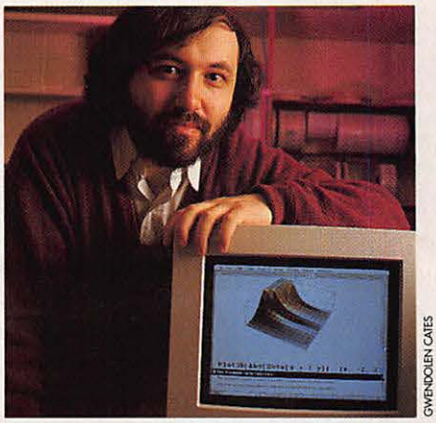
Of Math and Men

Stephen Wolfram's amazing program will change mathematics

by Steven Levy

Stephen Wolfram is a genius who does not know his place. Scientific geniuses are supposed to sit humbly by while college presidents and foundation directors sing their praises; they are then expected to wobble uncomfortably to the podium and accept whatever is given them. They are not supposed to go to war with the institutions that employ them. While they are assumed to be the masters of the domain inside their heads, no one wishes them to display a similar acuity in more secular matters, such as commerce or management. And certainly no one wants to hear these card-carrying geniuses bad-mouth those who came before them. We want wizardry from our geniuses, not egotism. And definitely not frankness.

Stephen Wolfram, who at age 28 has already accomplished a lifetime of good scientific works, has pondered what the world wants from its geniuses and has found it a standard not worth aspiring to. Frankly, he thinks the whole genius bit is rubbish. He would be just as happy if the term did not exist. His ultimate comment on the conundrum came after he was named one of the first winners of the MacArthur Prize Fellowship, a no-strings-attached stipend better known as "the genius award." At 21, Wolfram was the youngest recipient, and therefore the focus of considerable media attention. He takes pride that during his interview on national television, he stared down the camera, unabashedly picking his nose.



GWENDOLEN CATES

Stephen Wolfram, scientist and software developer

But do not think him an idiot savant. Wolfram has the tools for society's approval, but a disinclination to play the games necessary to win it. And why should he? "Every institution I've ever been associated with has tried to screw me," he once told me, though that was several years ago and cannot necessarily be applied to his current affiliation, the Center for Complex Systems Research at the University of Illinois. But more recently, Wolfram has been building an institution of his own: a software company. In keeping with its founder, Wolfram Research is radically different from its peers in the program trade: it does not rely on venture capital, it ships software on schedule, and most remarkably of all, its output is genuinely significant. Like Kirk Gibson in last year's World Series, it has been to bat but once, with the best possible results. Mathematica is not merely a product but a revolution.



GROWING UP ABSURD

Stephen Wolfram could have made good use of Mathematica—which is the ultimate number processor, and more—when he was a boy. At that time, growing up in England as a determined (if somewhat bratty) prodigy, Wolfram was discovering his powerful gifts for scientific pursuits. Without much encouragement from his elders, the boy studied particle physics, eventually completing a paper that was respectable enough for a professional physicist but remarkable for a 15-year-old amateur. He entered Oxford at 16, but was quickly disappointed with the course work. On his first day, he went to the first-year lectures and found them boring. The next day, he attended second-year lectures, also boring. A round of the third-year lectures proved equally unchallenging, so he eschewed classes altogether and worked on his own. His sole concession to Oxford's demands came at the end of his first year, when he took the required tests. He finished at the top of his class.

He eventually got his doctorate in America, at Cal Tech, only a few weeks after his 20th birthday. It was there that Wolfram's institutional problems really got serious. Wolfram became increasingly interested in the ability of computers to plow through a lot of the drudge work of science. He recognized that a truly interactive system for processing high-level

(continues)

calculations could be a boon to people like himself. So instead of hacking a private set of algorithms for his own work, he decided to attempt an ambitious program, a computer language for calculations, called SMP, which worked on VAXes.

This kind of work, though, was outside the domain of a well-behaved theoretical physicist. Surprisingly, many scientists—at least at the heady levels Wolfram had attained—saw computers as a lowly field. The spectacle of a real scientist choosing to write a huge computer program was unseemly—almost as if Bertrand Russell had announced he was devoting some months to auto repair. Yet that was not nearly as troublesome as the consequences that arose when Wolfram completed the project. A bitter feud erupted over who really owned the program. As a result, Wolfram left Cal Tech in a public huff. Though he eventually established an ownership share of the program, he never had full control of its execution and marketing.

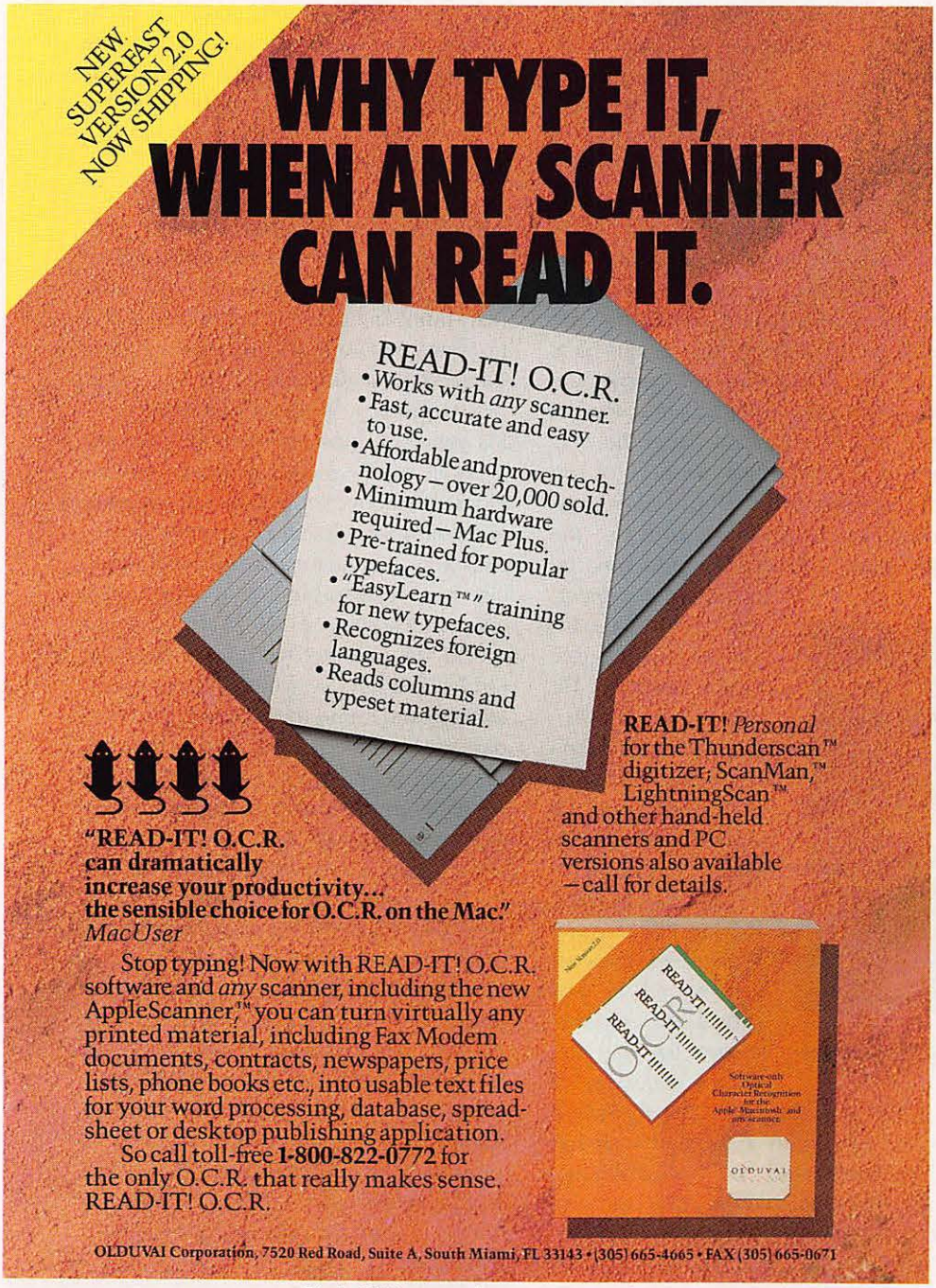
Wolfram's next stop was the Institute of Advanced Study at Princeton, Albert Einstein's former stomping grounds. Once more, he refused to behave like a good little genius. Again, his crime involved computation. Instead of continued good works in quantum field theory and cosmology, Wolfram became interested in a field of logic called cellular automata, which previously had been regarded as a relatively frivolous curiosity. Wolfram's work soon thrust cellular automata into the center of the burgeoning field of complex systems; his efforts were triumphantly justified. Still, some at the hoary institute believed that since Wolfram's cellular automation depended largely on computer simulation, it somehow was less worthy than "real" physics. Since Wolfram, who has seldom been accused of excessive humility, saw no need to bend over backward to accommodate his critics, the situation became uncomfortable, and soon he was out.

At his new home at the University of Illinois, Wolfram became interested once more in creating a computer system for high-level mathematics, a superversion of what he had tried to do with SMP. He realized that this time it could be done with microcomputers, so he organized a team to help him produce the product, started a company, and within two years developed a product that eventually was named Mathematica.

PROBLEM SOLVER

It is ironic: Wolfram gets flak from the scientific community for leaving theoretical studies behind to work on a computer program—yet Mathematica might be the accomplishment that brings him fame (and, perhaps not incidentally, fortune). It is a sumo wrestler of a program, demanding at least two megabytes of Macintosh memory to run minimally, and requiring at least a 68020 and 4MB to putter along at an acceptable rate. Even at $495 to $795, it is well worth the money to anyone who

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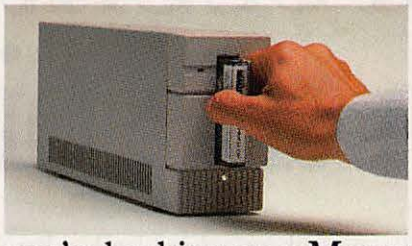


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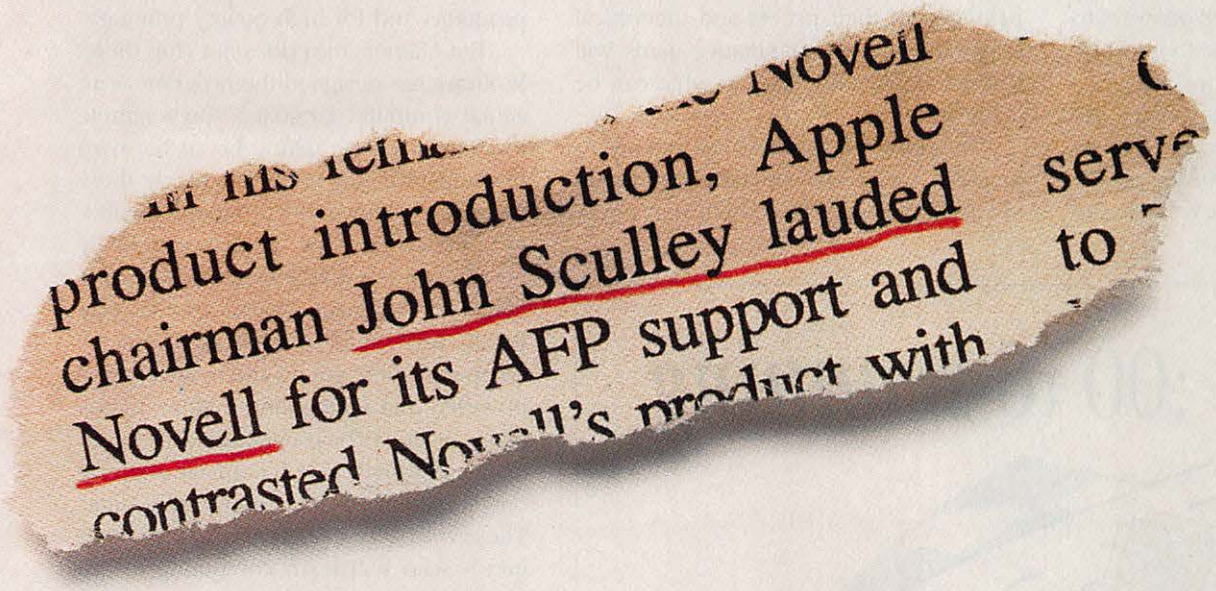
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needs to do calculations in algebra, calculus, or any number of complicated mathematical functions. Its speed is breathtaking: it spits back complicated answers to intricate problems, sometimes almost as quickly as the Enter key is pressed.

The implications of this power are enormous. Just as spreadsheets have infused financial modeling with the power of interactivity, Mathematica will liberate scientists from the ball-and-chain limitations that come from having to figure out difficult equations in order to get to the next step of their proofs and theoretical conjurations. The quantitative gains will lead to a qualitative leap in what can be achieved.

The power of Mathematica extends to graphics, too. Users can ask the program to plot the points of complicated equations, and actually see what the equations look like. The display is in color and is stored in PostScript for transfer to other programs and for high-quality printing.

But Mathematica does not stop there. Wolfram has designed the program as an actual computer language. On a simple level the user can define his or her own mathematical functions. Ultimately there is almost no limit to the program's flexibility. Wolfram's hope is that eventually people will use Mathematica as their first computer language. Much in the way BASIC was standard issue when microcomputers were young and relatively low powered, the mighty and mature micros of the 1990s will be programmed in Mathematica. Recursives? Polynomials? Figuring out numbers to the thousandth digit? These will be a piece of cake for the young minds who will learn computing in the world of Mathematica.

MATHEMATICA AND THE MAC

Only the Mac edition of Mathematica offers a user-friendly front end to the computational kernel standard to all versions. Only the Macintosh version allows users to create "notebooks" that blend text, graphics, and computations in free-form, to let imagination race as quickly as the calculations Mathematica produces.

Yet Apple seems to have lost the initiative on this program. Despite the fact that it is already a strong Macintosh seller and has garnered a cult of devotees, Mathematica is destined to be identified strongly not with the Mac but with the Next computer. Early on, Steve Jobs divined the importance of this program, made a connection with Wolfram, and even gave the program its name. When Mathematica was introduced, Jobs was on the podium at the press conference, getting the lion's share of attention. And when the Next machine was unveiled, Jobs confirmed that a copy of Mathematica would come bundled with each computer. And Jobs got the glory, despite the fact that the Mac version of Mathematica was already shipping—but with only tepid support from Apple.

"Apple is quite a complacent place," Wolfram notes. "I told them that Mathe-

(continues)



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Cut Your Macintosh Learning Curve In Half

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BY RANDALL D. SMITH

ORLANDO, Fla. - NASA is flying again and many of the flickering screens in the background are Macs! And, just like everyone else, NASA needed valuable, quality, and affordable training on their Macs. On November 30th, NASA sent 58 of their top employees to *MacAcademy* in Orlando.

In October, Motorola sent 38 employees to MacAcademy in Austin. GTE sent their employees to MacAcademy in Boston. Jet Propulsion Labs, GE, and the University of California attended in Los Angeles. The FBI, the University of Texas, Federal Express, CitiCorp, Polaroid, MIT, the State of California, Mobil Oil, and over 1,000 other companies choose locations throughout the U.S. to send their employees to MacAcademy.

Over 12,000 people, individuals and corporate employees, have attended MacAcademy in the past 14 months!

Why is MacAcademy so popular? The simple answer is that it provides what most Mac owners have been looking for since the day they first used their computer. MacAcademy bridges the learning gap that can't be filled by the magazines, trade shows, Apple dealers, user groups, and audio training programs. It not only provides what the graduates call the *Ultimate Macintosh Learning Experience*, but it accomplishes this task for an unbelievably low price.

MacAcademy is a two-day workshop taught by many of the nation's leading Mac experts. Each instructor is a top business executive who uses the Mac in everyday business operations. Each instructor draws on actual hands-on experience when teaching the operation of the Mac, Excel, Word, FileMaker, PageMaker, HyperCard, and Works.

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matica could establish a new category of computing for them—open up a substantial market, like desktop publishing." Mathematica is not simply an application, according to Wolfram, but a reason to buy a computer. He says that the returns from early warranty cards bear out this claim: between 5 and 10 percent of his users bought Mathematica along with new Macs. If Apple had worked to establish an identity as *the* machine to run Mathematica, as was done with PageMaker, then potential Mathematica users would make a no-brainer decision to get a Mac. "But while some people at Apple understood our product, others didn't," says Wolfram. "I got fed up trying to explain it to them." The problem was aggravated, he adds playfully, because "half the people I dealt with wound up on sabbatical."

So instead of being identified with the Macintosh, this groundbreaking new program will be seen as a generic product. Especially since Wolfram has been working on an OS/2 version that seems to deliver surprising power—mainly because it makes use of virtual memory, a feature that current Macintoshes lack.

SAINT STEPHEN

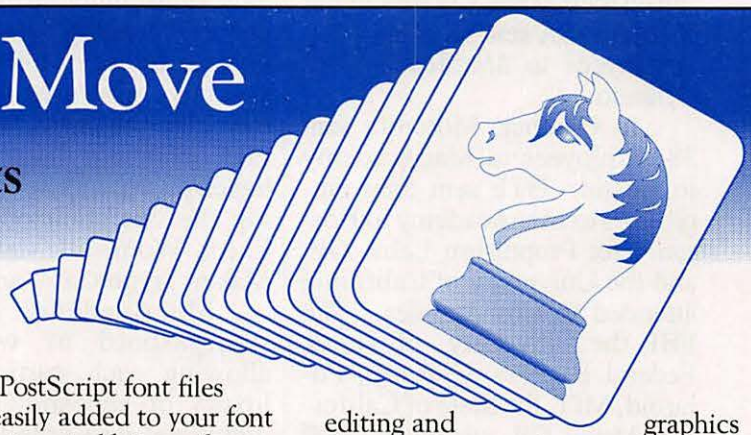
And what is next for Wolfram? Another break from the expected. Instead of collecting his winnings from his Mathematica jackpot and returning to the safe groves of academe, the scientist is settling more firmly into business garb. He insists that these clothes are no less honorable than his lab coat. "We now have 40 people here at Wolfram Research. It's getting more and more complicated. Solving problems in business requires creativity, the same as with problems in science," instructs Dr. Wolfram. He envisions the day when Mathematica is indeed a standard and its originator has raked in enough money to be measured in scientific notation. "People with a lot of money rarely do anything interesting with the money," he complains. Wolfram speculates that he might devote some of his expected bounty to "technological philanthropy."

If history is a guideline, Wolfram will get bored with business in a few years and go on to something else. But we can also count on him to make an indelible impression on the field. And when he goes on to his next area of conquest, he won't go quietly. Stephen Wolfram just doesn't know his place, and perhaps it is in that fact that his genius truly resides. ■

Steven Levy is a Macworld *columnist and the author of* The Unicorn's Secret: Murder in the Age of Aquarius *(Prentice-Hall, 1988).*

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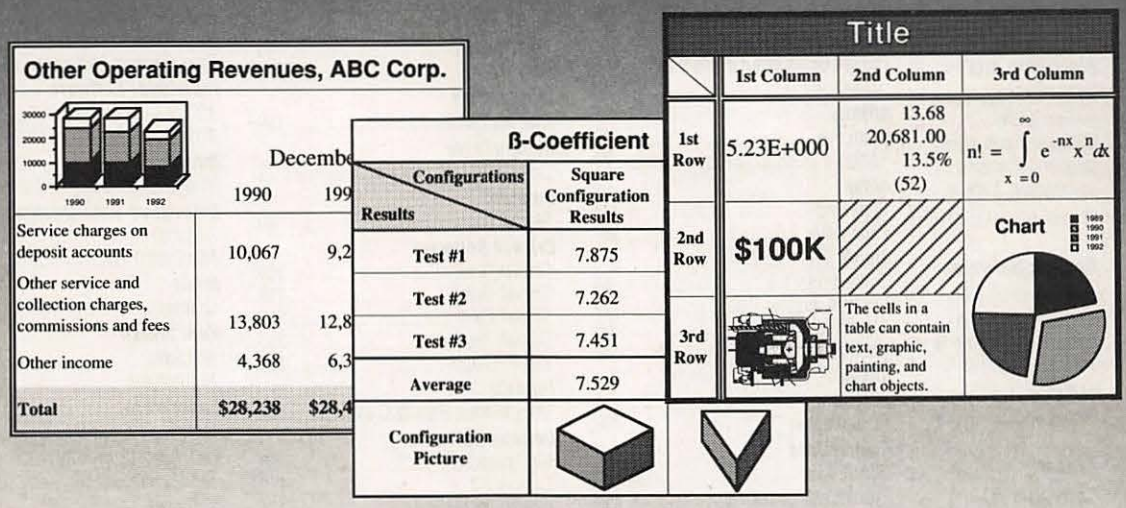
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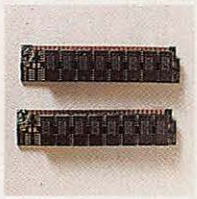
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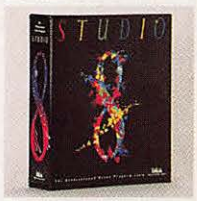
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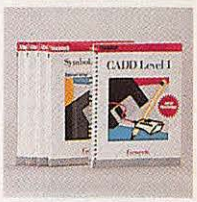
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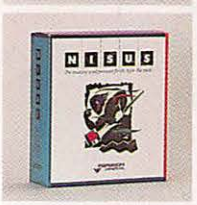
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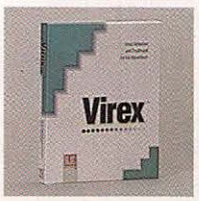
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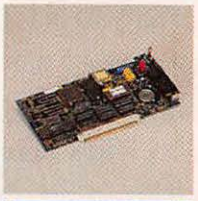
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MacMoney 3.2 61.

Symantec
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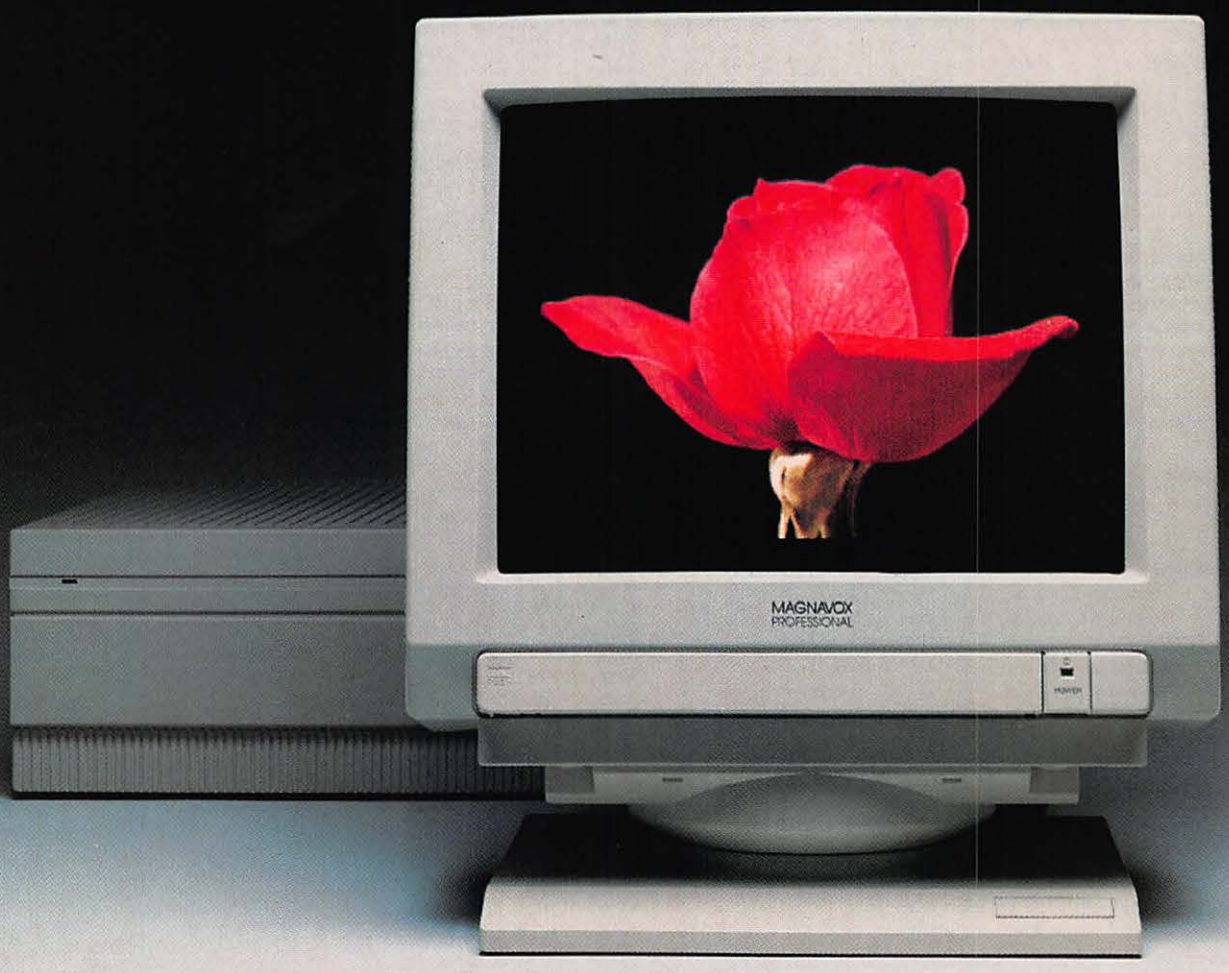
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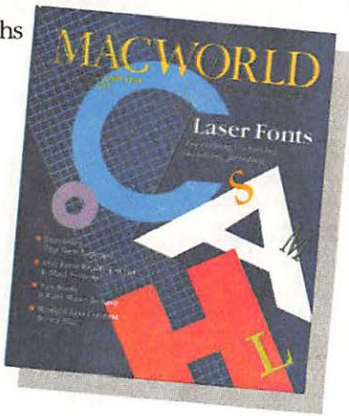
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Mail Order Update

Advice and information for the computer consumer

by Deborah Branscum

As the owner of Your Mac Source, Larry Liss ran a mail-order business from Atlanta until late last year when a couple of restraining orders put him out of action. Liss says his company shipped products to 90 percent of its customers. Macworld spoke to one satisfied customer who says he always got what he wanted from Your Mac Source at a very good price. He also reports that Liss "seemed like a pleasant, decent fellow." By all accounts, Liss is a likable guy. But that's no comfort to the people who reportedly lost thousands of dollars by putting their faith in him.

Your Mac Source is a good example of what to avoid when buying through mail-order vendors. True, the company did send products to many of its customers. But five readers contacted by Macworld reported waiting two to five months to receive hardware they paid for in advance. Liss says people knew they would have to wait but simply got impatient. That's not what some of his customers say, however. According to Sheri Berliner of Chicago, "The price for the SE I ordered from Your Mac Source was more than $400 less than the cheapest one I could find locally, so I figured it was worth waiting a couple of weeks for it to arrive." But she actually waited more than three months.

• *Before you buy, call the state attorney general's office where the vendor is located, the county consumer fraud unit, the postal inspector, and the Better Business Bureau.* Ask whether any civil or criminal lawsuits are pending against the vendor or any unresolved complaints filed with the BBB. Agencies don't necessarily share information, which is why it's so important to call them all. One agency may say no complaints have been filed against a company, while complaints may be pouring into another one across town. Calling can make a big difference. The Better Business Bureau in Atlanta had information about Your Mac Source in January 1988, nearly a year before it stopped doing business.



• *Ask questions and take notes—lots of them—when you order.* Is the merchandise in stock? When will it arrive? If your credit card is to be billed when you order, rather than on the actual shipping date, my advice is to take your business elsewhere. Why should you pay for something before you receive it? Also inquire whether there is a free trial period and what the terms are of the vendor's warranty, return, and refund policies. Find out if there is a toll-free support line, and then call the number to make sure you can get through. Is the vendor an authorized dealer? (Liss told *Macworld* last year that he could not be certain when computers would be available to ship because his company was small and not authorized by Apple.) Get the full names of all the individuals you speak to, in case you need that information later.

• *Pay by credit card. Never pay with cash or by check before your order arrives and you've had a chance to inspect it.* Remember that you're gambling when you advance even a partial deposit. Henry Wigenton of Lawrenceville, Georgia, wrote a check to Your Mac Source for an order he never received. Now he and his wife are suing Liss with a group of other disgruntled customers. "He said he was a wholesaler and he didn't keep anything in stock and he had to have the money up front," says Denise Wigenton. Her boss also ordered from Liss, but because he paid with a credit card, he was able to get a

(continues)



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Henry and Denise Wigenton and Gary Dutton (center) say they lost more than $11,000 to a mail-order vendor because they paid for equipment in advance.

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refund through his bank. Wigenton has to stand in line for her money and may never get it back. Several customers who filed complaints with *Macworld* say they were asked by Your Mac Source to send cashier's checks to "expedite" an order. Run, don't walk, away from such requests.

• *Complain early and loudly.* Several customers told *Macworld* that Liss responded to their calls with many excuses. "It's already on the truck." Or, "Half your order is here, half isn't." Or, "I'll personally buy you a machine from another vendor and ship it out today." Then, the customers say, he stopped taking their phone calls.

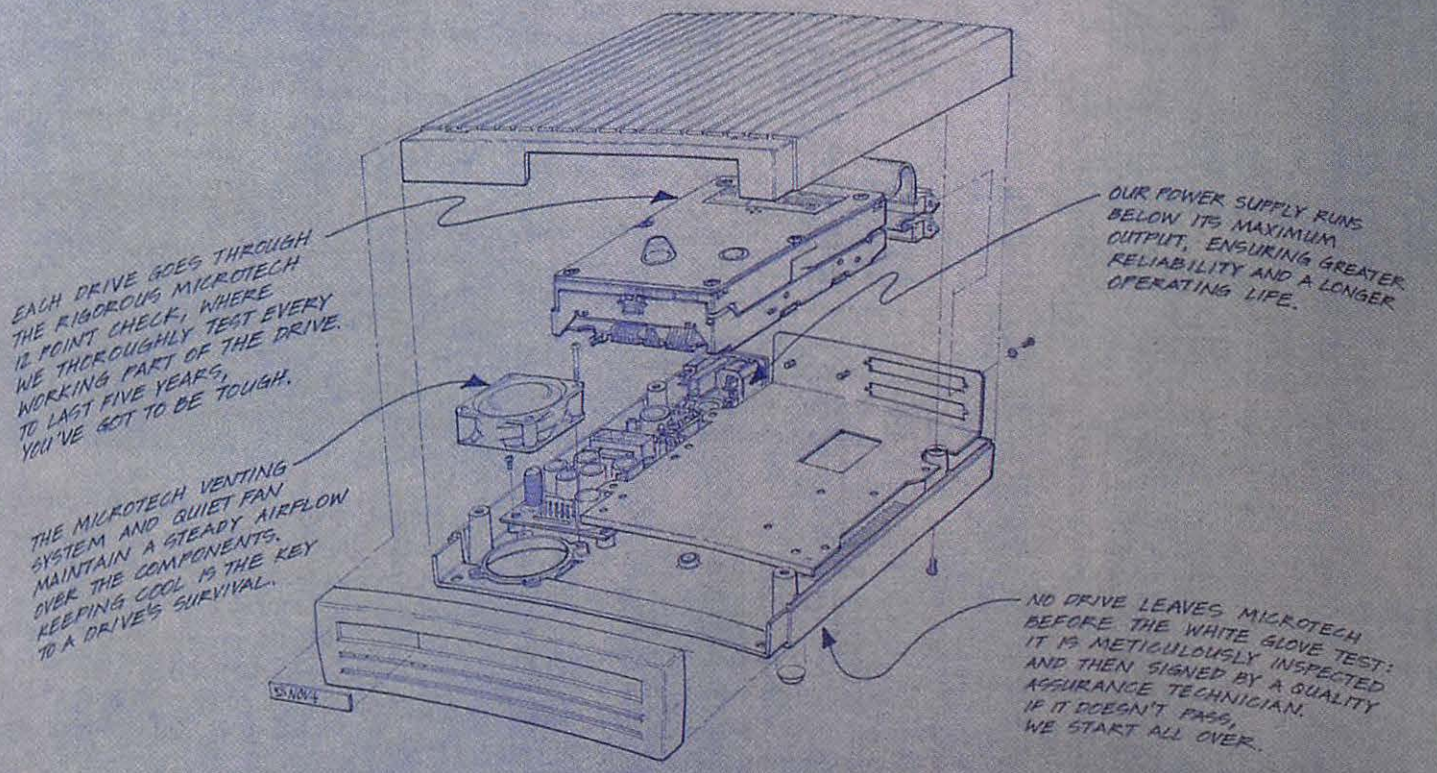
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Others may want to take more drastic action. One of Liss's customers reportedly filed a criminal complaint of theft against him last year when the company was still in business. The charges were dismissed after the customer received a $20,855 refund. Some unhappy people have hired attorneys. Sidney L. Moore, Jr., is an attorney who is representing 14 customers of Your Mac Source and says he may be able to include others in this lawsuit. (Individuals who are interested in being

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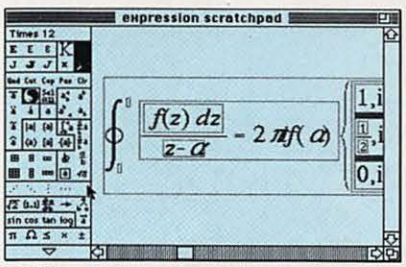
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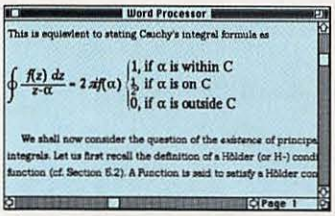
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SERVICE HEROES

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Dove technician Page Gilley listened carefully to the problem and said Dove would repair or replace the board under warranty, even though it was nearly two years old. "Within a week's time, the rejuvenated board was back at my repairer's shop, along with a detailed lab report," writes Miller.

Being able to speak to the person who would solve the problem was a "happy experience," says Miller. Equally impressive was the fact that the technician had the authority to determine, based on a phone conversation, that the repair could be dealt with under warranty.

Steve D. Williams of Kansas City, Missouri, writes in praise of MacConnection. "Recently I did business with an exemplary mail-order company that I feel is deserving of recognition.

"I had ordered a hard disk and found that it was noisier than I had expected. I called customer service and was told that they would ship a new drive immediately, or I could have a refund. The second drive I received was quieter, but I soon realized that I needed more capacity. They said fine, and sent a larger drive.

"During the following week, they began a special promotion offering a built-in modem with the drive at no extra charge. By this time I was feeling a little guilty, but they said 'no problem' and shipped a drive with the modem." Williams explains that because UPS was a little slow in picking up the drives for return, at one point he had three drives but his credit card had only been charged for one.

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included in the action can write him at 470 First Nation Bank Building, Decatur, GA 30030; he requests that people contact him in writing only.)

The FBI is working with the Georgia Bureau of Investigation and the Postal Service to investigate Your Mac Source. Readers who placed orders and did not receive the products they paid for should send a cover letter and documentation to Todd Letcher, Special Agent of the FBI, P.O. Box 1683, Atlanta, GA 30370. Letcher says he is putting together a list of people who feel victimized by Your Mac Source. The documentation should include a chronology of events, copies of any correspondence with Your Mac Source, a copy of the front and back of the canceled check, or a copy of the credit card statement. Readers who've sent documentation of their complaints to the Postal Service in Atlanta do not need to send another copy to the FBI, since the two agencies are cooperating.

Letcher says it is not clear when the investigation, which began last year, will be completed. He notes that it's not a criminal offense to be a poor business person, and Your Mac Source did provide products to many customers. He adds that it's difficult to prove an original intent to defraud. Attorney Rees Smith, who represents Liss, says, "He's not a criminal—there's no criminal intent," but concedes there were bad business decisions made.

It's important to remember that there are many responsible mail-order companies out there. But unless you do your homework well, buying by mail can be a crapshoot. If it's a small purchase and you are risking little, you may not want to bother checking up on a company's reputation. But make those calls if you're spending big bucks.

For a more in-depth look at savvy mail-order shopping, see "Navigating the Mail-Order Channel," *Macworld,* March 1987. Every issue of *Macworld* also carries information about your rights as a mail-order consumer (see page 275 of this issue).

(Thanks to Nancy Dunn and Wendy Monroe for contributing to this report.)

(continues)

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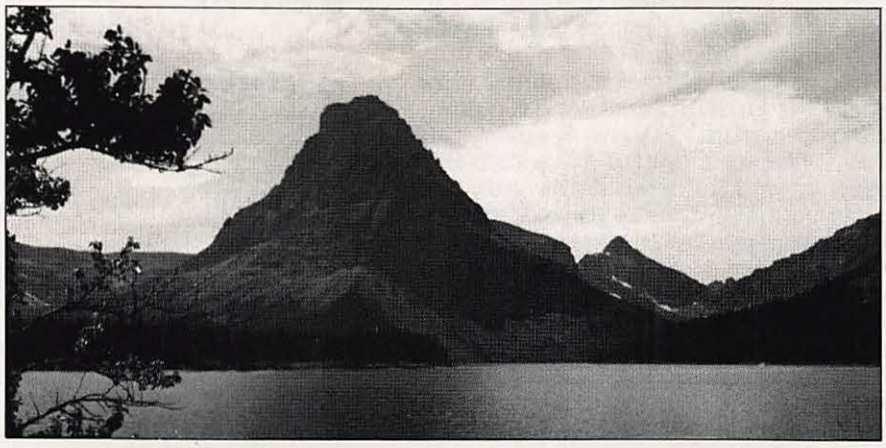
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MAC-PACKING MINORITY

Margaret J. Cole wants to put herself out of business. She founded MacWomen last year to help increase the number of women in the microcomputer industry and says, "I would love for there to be no reason for MacWomen to exist." But until then, Cole wants to help more women make it in microcomputing by providing the information and services they need. That includes making them aware of other organizations and establishing scholarships for young women studying in technical fields. (A sister organization, PC Women, is also in the works.)

Cole has worked at General Dynamics as supervisor of manufacturing systems development for the past seven years and once taught computer applications and statistical analysis for mainframes at the graduate level, so she is no stranger to the sometimes macho world of computing. Cole plans to establish MacWomen as a legal nonprofit entity and is looking for donors to the scholarship program. Members can expect a bimonthly newsletter and other services for their $25 annual dues; write MacWomen, P.O. Box 638, Alta Loma, CA 91701 for further information.

SUMMER FUN

The Boston Computer Society is sponsoring an International Computer Forum in Venice this summer, June 16 to 24. This computer camp for grown-ups will focus on desktop publishing, although some programming may be included. Classes for 60 will be held in a restored palazzo on the Grand Canal. Representatives from European user groups have been invited to make appearances. And after-class activities and tours are being planned. Call the BCS at 617/367-8080 for prices and details. Ⓜ

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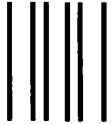
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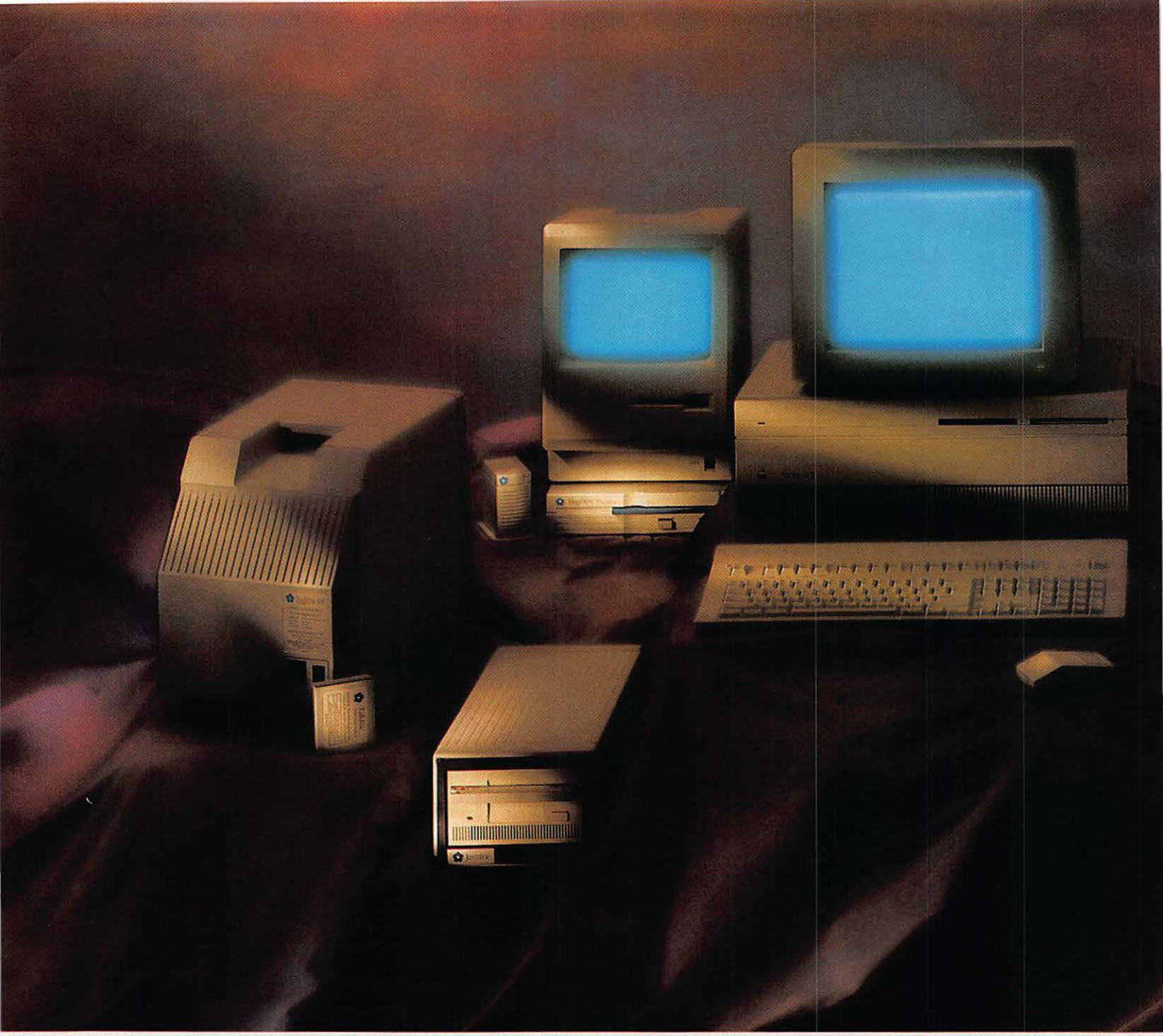
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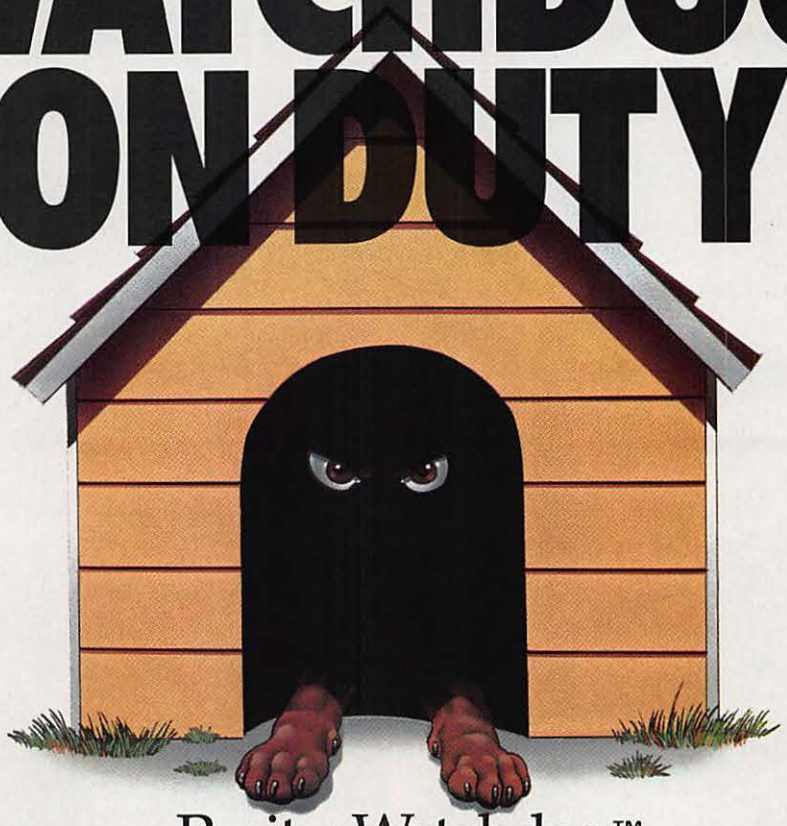
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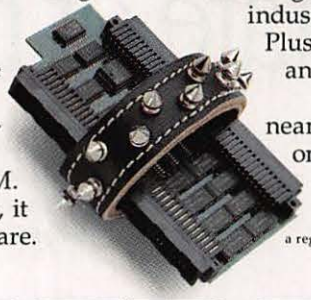
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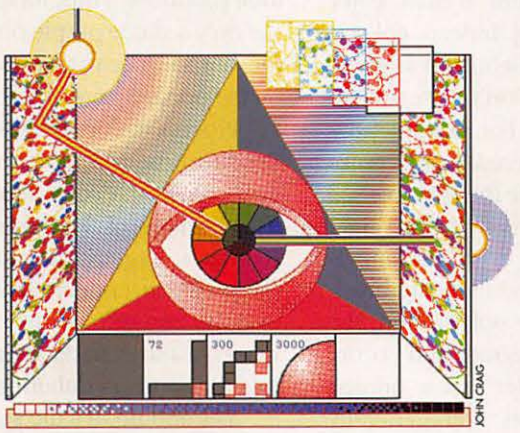
Why what you see isn't what you get

by Thom Hogan

Henry Ford and Steve Jobs got it right: you can have it in any color you want, just as long as that color is black. Henry Ford, of course, was talking about the body color of the original Model T; Steve Jobs's black fetish involves pixels.

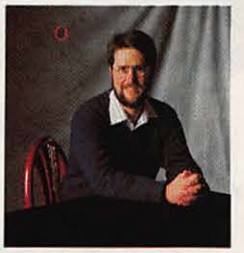
The nice thing about black pixels on a white display (or white pixels on a black display) is that there is no question what they mean—a pixel is either on (black), or off (white). This translates into a nice digital state, and it's easy to duplicate, no matter what output device you might use. To print the standard Mac image on a printer, for example, you only need ink (black) and no-ink (paper = white). Measuring the integrity of paper copies to the screen image in such a world is easy. You simply check to make sure that each screen pixel is correctly represented by an inked pixel on the printed page.

The Macintosh II's color abilities lead us into a different realm, however. A realm that is fraught with frustration if you try to match what you see on a monitor with what you get from a printer. And if the source of a graphic image is a color scan of original art or a photograph, you've added yet another variable to the game, and the color integrity of the ultimate printed image may suffer even more. Color takes us out of the digital black-and-white world and into the world of analog (continuously variable) values. Mix in a little real-world physics (color is a property of light), and there are lots of problems to identify and correct.



A LITTLE COLOR EXPERIMENT

If you've got the equipment to do so, try this simple test: Scan an original color image. Bring the scanned image up on the Mac II's display. How closely do its colors match the original? (My experience here is with the excellent BarneyScan film scanner, which I used to input a number of my favorite 35mm slides.) When I tried this, I found a great deal of *blocking* of color—that's a printer's term for what happens when a bunch of subtle variations on a single color end up the exact same color—and it should be noticeable on the screen. Blocking occurs most often with images that have long gradations of one color, and is almost guaranteed if you are only using an 8-bit color video card. The usual result of color blocking is that shadow areas in the original photograph lose details and become blacker, and the apparent contrast of the overall image increases.

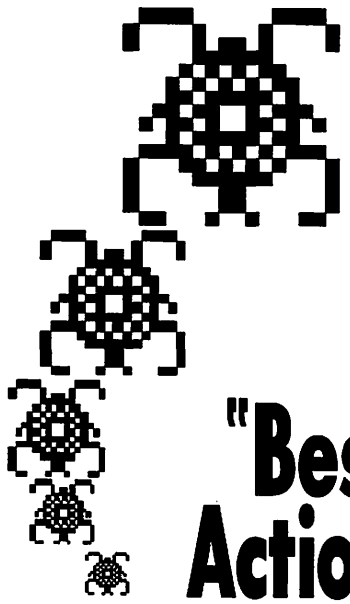


Worse still, *banding* may be a problem with pictures primarily composed of 1 or 2 colors. Banding (distinct bands of colors rather than a smooth gradation) happens because the number of color shades needed to represent the image exceeds the Mac's abilities. For example, as I sit here on the Pacific coast looking out toward the Farallon Islands, the sky is mostly cloudy (lots of gray shades here, with a bit of blue), and the sea is choppy (lots of blue shades here, with a bit of gray). And a squall out about 10 miles makes it difficult to tell where the sky ends and the sea begins. A scan of a picture of this scene would result in significant banding, because there are only 2 colors out there—albeit in almost infinite variety—and the 256 varieties of gray and blue the Mac's 8-bit video board could resolve are not enough to prevent banding.

Thus, it's important to learn how to interpret images. Run as many images through your scanner as you can, and try to generalize how well the scanner handles various conditions. Well-lit images with low contrast ratios seem to work best for me. Brightly colored images (like a photograph taken at night in an amusement park) also seem to do well. But pictures taken in sunlight without fill flash seem to have too much contrast for the system and result in details being lost in the shadow areas. Very low contrast images also seem to lose detail, although this is less true if

(continues)

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you've got a 24-bit color board.

Once you've got a color image into the Mac, create a set of process color separations. (Color separating—the process of using cyan, magenta, yellow, and black inks to create a printed color image—is discussed in "Color Separation Explained," *Macworld*, February 1989.) When I tried this I used LaserWare's LaserPaint Color II. Other products have appeared recently that give you more control over the separation process, most notably Abaton's PhotoMac, which I have yet to work with. (For more information on PhotoMac, see *Reviews* in this issue.)

Have proofs made of the color separations, and compare the proofs against the original art and the scanned image. Are there any new problems? Here I found that the color balance had shifted. The greens in the original image of a car parked on a lawn had far more black and brown components to them than the proofs. If you perform the same test, you end up with similar results: the final copy doesn't match the colors of the original. In many cases this will be only a subtle shift, in others it will be a major, obvious change. In fact, the colors in the printed copy probably won't even match those in the scanned image.

HOW WE PERCEIVE COLOR

One underlying problem is that color interacts with everything. Indeed, color is an integral property of light, and as such, brings up issues that don't arise in the black-and-white world. For example, the color we see on a printed page comes from reflected light, while the color we see on a monitor comes directly from a light source. The difference in source affects perceived brightness, and there are much more subtle issues, like polarization, the type of light being reflected, and so on. Just for starters, consider that a printed image viewed outdoors will generally reflect a bluer source light than the same image viewed indoors under candlelight (that's a reddish source). Standard fluorescents complicate the picture even more because they don't emit all colors of light; scanning a picture taken under fluorescent light is going to result in an image that has only greens, blues, and a few yellows and reds, no matter how much you try to adjust the scanner.

So how can I identify a cloth as red indoors under normal incandescent lighting, take it outside, and still perceive it to be red? Well, the short answer is that my brain does the fudging for me. It knows the cloth is red, so it adjusts my perception to accommodate varying light sources. Unfortunately, this is exactly the thing that gets people into trouble when they try to reproduce accurate color images using Mac IIs. You might *think* you're seeing the same colors, but if you take the time to carefully analyze and compare the original and copied images, you'll usually discover that they differ a lot.

PROBLEMS WITH PRINTERS

Add to these problems the fact that most of the color output devices currently available don't exactly have infinite color abilities. Almost all the color printers—like the Tektronix thermal printer I've used or the ImageWriter II with a color ribbon—use dithering (alternating different color dots) to approximate a color. If you look closely at an image printed on one of these printers, you'll find that purple is actually some pattern of alternating red and blue (or magenta and cyan) dots. On the Mac's display, however, purple is the superimposition of the red, blue, and green dots the tube produces. Thus, looking closely, you see only a single purple pixel on the monitor, but see alternating red and blue dots on the printed page. Not exactly the same.

Process color images don't actually produce true purple, either. Each of the four colors in a color separation is set as a collection of halftone dots that are rotated at slightly different angles. Thus the purple in a printed image, if examined closely enough, would appear to be magenta and cyan dots slightly offset. Isn't this the same as dithering?

Yes and no. It's the same in the sense that multiple dots of different colors are perceived by our eyes as a single color. It's different in that the dots in a color separation are always one of the four colors, and always appear in the same relation to one another. And the dots don't all line up in nice rows and columns, which makes it

(continues)

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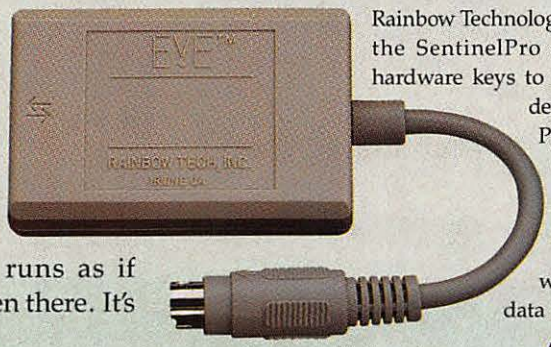
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even harder for our eyes to discern individual dots. Dithered images, on the other hand, use a varying number of colored dots to represent a color. Black may consist of just black dots, while purple may consist of cyan and magenta dots, and a more complex color may consist of four colored dots. Unfortunately, the printer has to put these in fixed row and column positions on the page, and if you look closely, you can see the individual dots.

The original Tektronix thermal printer wasn't particularly subtle about how it created colors. I remember orange images that printed as if the color were yellow with red polka dots. But the folks up there in Oregon have done a lot of work, and their newest machines seem to produce much subtler dithering patterns. In general, darker colors have always been pretty good on the Tektronix printer, while the lighter colors suffered. Samples I've seen from the latest Tektronix models are much better on all colors. Still, the colors do vary somewhat from the original artwork.

There are other problems with print dithering. Using a 24-bit color video board, you've got virtually infinite color gradation abilities (okay, not infinite, but certainly the ability to differentiate between 256 different shades of blue, for example, is approaching infinity as far as our eyes are concerned). Color printers, however, are usually limited to a single shade of each color, and use dithering to approximate shades. To produce 256 shades of blue using only white (paper) and blue and black (inks), you'd end up with a dithering pattern of at least 3 printer dots by 3 printer dots, and lose resolution here, because one screen pixel now is equal to nine printer dots.

PROBLEMS WITH SEPARATIONS

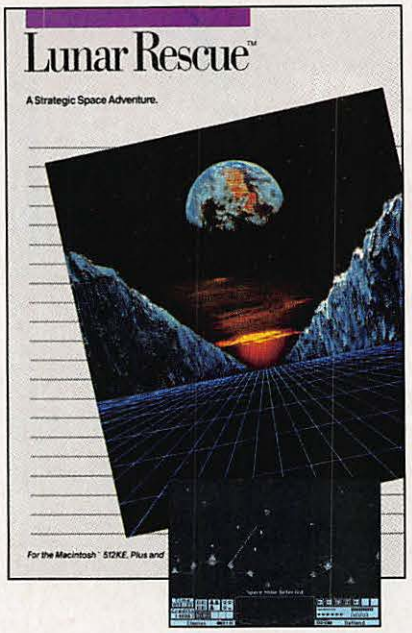
Okay, enough about dithering. If you really want good color images, you'll need to move to color separations. So what about those programs that produce color separations directly, like Adobe Illustrator 88? Don't they maintain color integrity if used to produce artwork that will be printed on an offset printer?

The answer, unfortunately, is no. We're getting closer to achieving color fidelity by using a program that color separates directly, but, just as in the traditional world of color graphics, there are still variables that can cause problems. First of all, using the color you see on the display as a guide to what you get is not going to work, no matter what the software manuals tell you. The things that trip us up include the fact that the luminosity (brightness) and color focus (alignment of the red, green, and blue guns of the TV tube) vary from the center of the display to the edges. The edges of the screen may lose as much as 30 percent of the brightness, for example. Thus, bright red in the center of the display will not be so bright on the edge. If you're trying to color match, the position on the screen where you attempt to do that will make a difference. (Special calibrated monitors are available, but they're very expensive.)

Second, the monitor is a light source, while the thing we're comparing it against (usually a printed color sample) is a reflected subject, as I mentioned earlier. Color balance will not be accurate. If we could take the same RGB color components and print them on a page (which we can't, for extremely technical reasons), the printed image still wouldn't exactly match the screen's display, despite the fact that we generated the colors using the same source values. We simply perceive reflected color differently than direct color.

Third, most color separators I'm familiar with perform a four-color separation. The black layer effectively increases contrast and edge sharpness, but it also affects the perceived color. Beyond that, very few offset printer/paper combinations can accept 100 percent of all four colors. Indeed, the limit is usually set at around 200 to 250 percent saturation so that the paper doesn't get soaked with ink and allow the colors to run. For example, if you specify a color as 80 percent cyan, 80 percent yellow, and 40 percent magenta, you're at the 200 percent saturation level even before you add the black layer. Printing limitations will effectively reduce the color-saturation values from what you've specified within a program to something like 70 percent cyan, 70 percent yellow, 35 percent magenta, and 25 percent black. The result is not the same

(continues)



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Circle 455 on reader service card

color you asked for.

Graphic artists and print shops have been grappling with the problem of color fidelity for some time. The digital world of the Macintosh II has simply added another dimension to the problem. In general, for simple spot color (such as a colored headline) most artists use one of several popular color-matching systems, such as Pantone. By agreeing to print something to match a Pantone color, a printer is agreeing to mix inks (and control other printing variables) so that the resulting color exactly matches a Pantone color swatch. Several software programs have now begun to support Pantone color, and I expect to see more in the future. Be forewarned, however, that the color of your final printed image will match the color swatch, not the screen image. Thus, using the Mac II as a color preview device is not particularly effective.

We are still a long way from being able to generate predictable color images from multicolor graphics. I know of no good way to use the Mac II as a realistic color-preview device when working with the subtle gradations of color that are often found in scanned images or digitized photographs. Don't despair; some very exciting products in the digital prepress category have just become available—like PhotoMac and Letraset's ColorStudio—with more on the way. The major problem so far is cost. But affordable software and hardware solutions are on the way.

Until then, don't trust your monitor. Match the printed results to the original art (or color you're trying to match), and use the display simply as an approximation device. And for those of you trying to puzzle out the subtleties of color interaction, the art of mixing and matching colors for a particular effect, I suggest some additional reading: *Color Harmony,* by Hideaki Chijiiwa (North Light Books 1987). M

Thom Hogan is president of Macreations, a Macintosh software developer, and publisher of The Macintosh II Report. *His reference book,* Programmer's Macintosh Sourcebook, *was recently published by Microsoft Press.*

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Circle 452 on reader service card

MACWORLD NEWS

by Tom Moran

Tough Mac Works Fast

Hoping to make serious inroads into the industrial and instrumentation markets, GreenSpring Computers has introduced a family of Mac II–based products to provide complete multitasking and real-time operation to meet the exacting needs of this market niche.

One product is a ruggedized Mac II with a heavy steel chassis and a cast aluminum front bezel that protect the system from impact. The rack-mounted system unit includes a filter for its 40-megabyte hard disk and extra fans for cooling. Resistant to vibration, dirt, dust, and dripping liquids, this $9950 system unit includes a video board and 1MB of RAM. A ruggedized 13-inch Sony Trinitron color monitor lists for $2450. A capacitive touch screen for the monitor is an $850 option. GreenSpring's standard software tool kit includes Apple's MR-DOS (Multitasking Real-time Distributed Operating System), MPW scripts, example and template applications with source code, HyperCard XCMDs, and debugging and control software.

GreenSpring also offers SpringBoard, a 16MHz 68020 coprocessor board that gives the system unit true multitasking I/O control and instant response for applications where real-time means milliseconds or less. The coprocessor board has full NuBus master/slave capability and accepts up to two IndustryPacks (IPs), which are I/O piggyback boards for various interfaces. With 1MB of RAM, SpringBoard sells for $2400.



ROBERT CARDIN

GreenSpring's industrial-strength edition of the Macintosh resists damage from vibration, dirt, dust, and spills. Systems start at $9995.

A second NuBus board, called SupportBoard 1270, can hold up to two additional IPs for more I/O flexibility. It retails for $295 without IPs. Different IPs individually support the IEEE 488 (GPIB) interface, serial I/O via RS-232C or RS-432 ports, and A-to-D and D-to-A conversion. The IP-Digital 24 controls the power for large manufacturing devices. The IPs range from around $300 to $500 each. For more information, contact GreenSpring Computers in Redwood City, California, at 415/369-5982.

New Color Boards from RasterOps

RasterOps, creator of color graphics boards for the Mac II, has recently announced a line of 24-bit and 32-bit color graphics boards offering several additional features over the company's present 24-bit and 32-bit products, the ColorBoards 64, 104, and 124.

The new ColorBoards 224, 232, and 264 have *full chunky* color, Apple's new standard for providing 24 bits of color plus an 8-bit alpha channel for video overlay and special effects. The RasterOps boards follow Apple's QuickDraw guidelines and are compatible with all Macintosh software that follows the QuickDraw standard. RasterOps's earlier boards had used a method called *chunky-planar* to provide 24-bit color based on Apple's 8-bit color QuickDraw guidelines.

In their 24-bit and 32-bit modes, all of the new ColorBoards can display as many colors as there are pixels dis-

(continues)

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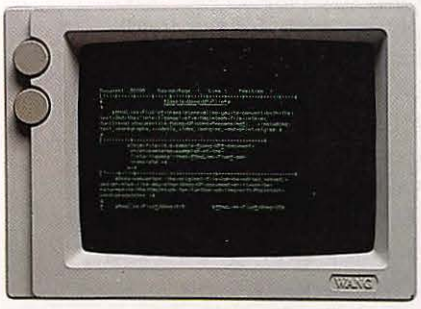
Microsoft Word

MacLink*Plus* doesn't stop there, however. It offers full Wang VS Workstation capabilities, allowing easy access to Wang word processing, data processing and electronic mail. All 32 Wang Workstation functions can be executed through familiar Macintosh menus or command keys, and you'll even be able to use the mouse on Wang displays.

Software for the Macintosh, software for the Wang (8" or 5.25"), software for the PC and a direct connect cable (you can use a Hayes or compatible modem if you prefer), is included in the MacLink*Plus* package; everything you need to be up and running in minutes.

So call (203) 268-0030 for your nearest DataViz dealer, because no matter which Wang system you're using, there's a MacLink*Plus* solution to connect it to the Mac.

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Macintosh 2110 Terminal Emulation



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New ColorBoards are compatible with 32-bit QuickDraw.

played. ColorBoard 224 offers a choice of 1024-by-768, 800-by-600, or 640-by-480-pixel resolution, with a PAL video option of 768-by-576 pixels. The 224 board also lets you choose a 1-, 2-, 4-, 8-, or 24-bit color display on a 16-inch or 19-inch monitor.

The ColorBoard 264 is a little simpler, offering only the 640-by-480-pixel resolution on a 13-inch monitor. ColorBoard 232 has up to 32-bit color display capacities with an NTSC broadcast-quality video option of 640-by-480 pixels.

With 24-bit technology it is possible to simultaneously display 786,432 colors from a palette of 16.8 million colors, which results in 1024-by-768-pixel photo-quality images (Apple's graphics board supports only 8-bit color with simultaneous display of 256 colors from a palette of 16.8 million). For more information, contact RasterOps in Cupertino, California, at 408/446-4090.

—Allan Lundell

A View to a Skill

Traveling Software, the company that brought us Lap-Link Mac, has now developed system software that acts as a logical layer over the operating system and organizes cross-sectional views of information regardless of what files or applications the information resides in.

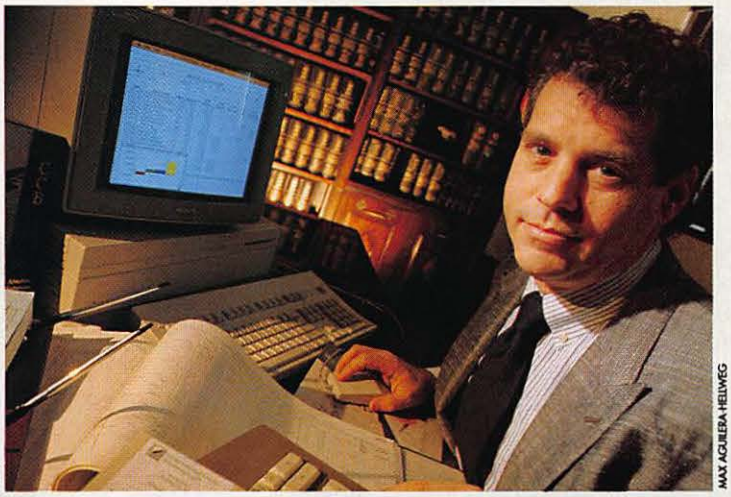
ViewLink Mac, which should make its appearance later this year, works by generating cross sections of a user's existing data and forming them into a view. The user defines the subject of the view, which could be a project, a person, or a subject, for example. The information in a view may reside in combinations of text files, stored E-mail messages, spreadsheets, databases, PageMaker files, HyperCard stacks, and so on.

The system software is designed to work over a network and to keep track of the location of files even after their originator has sent them on to a file server or to another user. Boolean algebraic searches by keywords, application types, dates, and so on, are possible. For example, you can ask for changes made after a certain date to the costs of labor for a particular project. ViewLink will retrieve the information regardless of where it resides on the network, and regardless of the applications that generated it. For example, if you have two categories of documents, say Dogs and Cats, and within a Dog file you type the word *cat,* ViewLink automatically copies the file into the Cat directory as well. It does not index every word to every other word. Another way to think of ViewLink is as an associative access manager—that is, it manages access to associated information.

The PC version of ViewLink ($149.95) is currently compatible with about 55 common applications for the PC. For more information, contact Traveling Software in Bothell, Washington, at 206/483-8088.

Developers Using Excel

Microsoft Excel is fast becoming the application of choice among software developers as a platform for developing applications. Last year more than 280 independent software developers showed up at Microsoft Corporation's 1988 Excel Developer's Seminar to learn how Excel functions as a development tool.



MAX AGUILERA-HELLWEG

Richard Shaw test-drives his Classic Bookkeeping, created in Excel macros so it can run on either the Mac or the IBM PC.

Excel's macro language enables developers to write programs that will run without alteration in three environments: Macintosh, Microsoft Windows, and Microsoft's MS OS/2 Presentation Manager. The appropriate version of Excel interprets the macros as they are executed. One company, Absolute Solutions, has taken advantage of this capability to create a bookkeeping system called Classic Bookkeeping. The $995 application—written entirely in Excel macros—creates journals and ledgers and stores data in Excel worksheets.

Excel supports a number of features, including linking to other programs, that make software development easier. Using both the Windows and Macintosh versions of Excel, developers have created templates, databases, macros, and tutorials; more than 1000 of these can be ordered from Heizer Software's mail-order catalog.

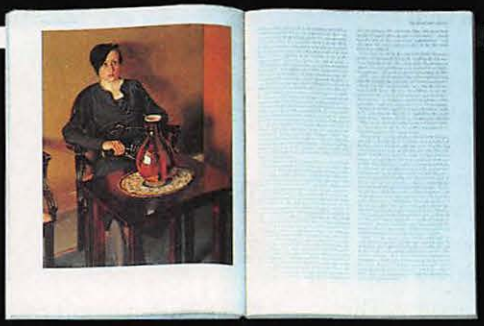
As a spreadsheet, Excel has also been attracting a good deal of corporate commitment. For example, Ford Motor Company is standardizing with the use of about 35,000 copies of Excel internally. Ford will use the program not only as a spreadsheet, but also as a front end to engineering databases that run on DEC VAX and Honeywell ULTRIX systems, allowing access to the mainframe data from desktop computers.

For more information, contact Absolute Solutions, in

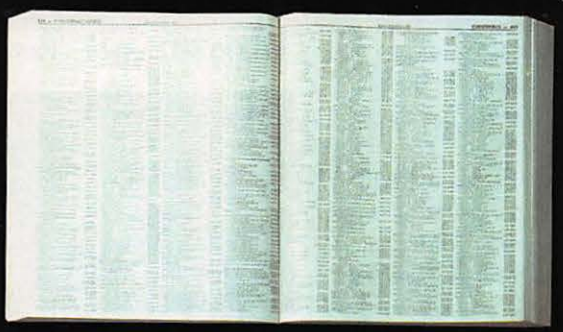
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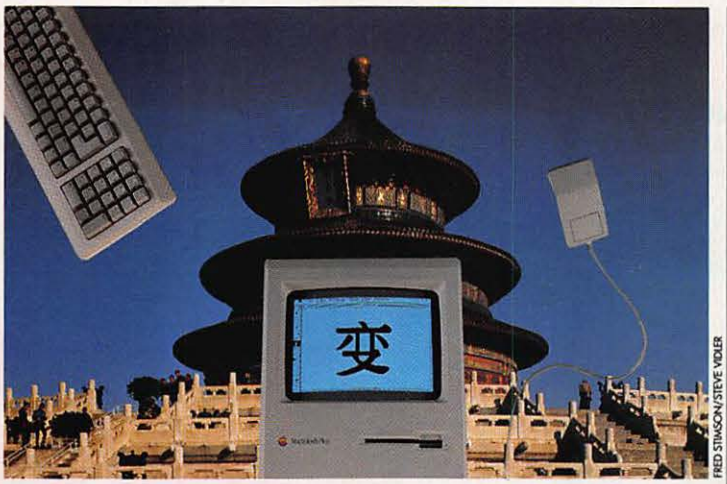
In the northeastern port city of Dalian, China, unpredictable electrical shutdowns caused by power dips and surges are one of the major drawbacks to desktop publishing.

In spite of this, a Macintosh Plus and a desktop publishing program designed to work with Chinese characters are helping 16 English students at two universities produce China's first desktop published magazines.

Chinese Pentimento will be a collection of memories from third-year students at Liaoning Normal University, a teachers college. *Da Wei Muse* will glean the best journal entries from fourth-year English students at Dalian's Foreign Language Institute. Both magazines will be bilingual.

Students are typing English versions of their stories using MacWrite. Many are learning how to type and how to use a computer for the first time. The Chinese characters are produced with the help of Apple's own Chinese word processing program, ChineseTalk. The students type in pinyin (a standard system for transliterating Chinese) and choose the appropriate character from character families shown on screen.

The students use desktop publishing software to lay out Chinese and English stories side by side—with the Chinese reading from top to bottom and the English reading from left to right. Artwork will be scanned by Apple's distributor in Beijing.



FRED STIMSON/STEVE WIDLER

Although this Chinese publishing project has only just gotten started, students are already enraptured with the Mac. The Guided Tour of Macintosh has been a particular favorite, with its animation and interactive structure.

Perhaps the most important educational benefit for these Chinese students is that the Macintosh has overcome stigmas associated with computers. Students who formerly had no interest in computers have found themselves playing with the Mac and understanding its power.
—Dina S. Temple-Raston

A New Agenda for Gaming

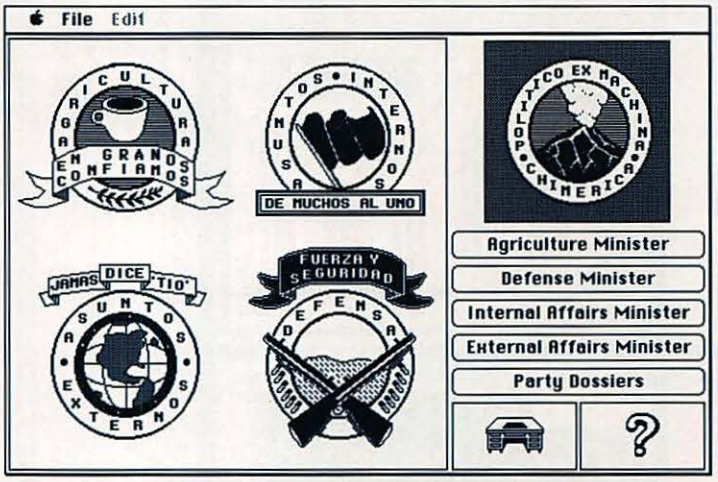
One way to really learn about the political dynamics of Central America is with Springboard's Hidden Agenda, a computer game in which you actually take the role of a newly empowered *presidente* of a fictional Latin American nation.

Hidden Agenda is fashioned in the same participatory-history mold as Balance of Power, but with an emphasis on the personalities involved in the events that unfold. The game's interface, reminiscent of HyperCard, is easy to master; strategy and wisdom, rather than puzzle-solving, are the keys to success. However, political realities make success a relative term: you'll do well to avoid a guerrilla war or a coup.

Hidden Agenda's designer and its producer, respectively Jim Gasperini and Ron Martinez of Trans Fiction Systems, claim to have successfully simulated the kinds of characters and situations one might encounter as the leader of a Central American country recovering from the overthrow of a repressive dictator. You must modulate the (sometimes forceful) demands of people you encounter. Hidden Agenda is a harrowing and ultimately enlightening experience that changes each time you alter your strategy.

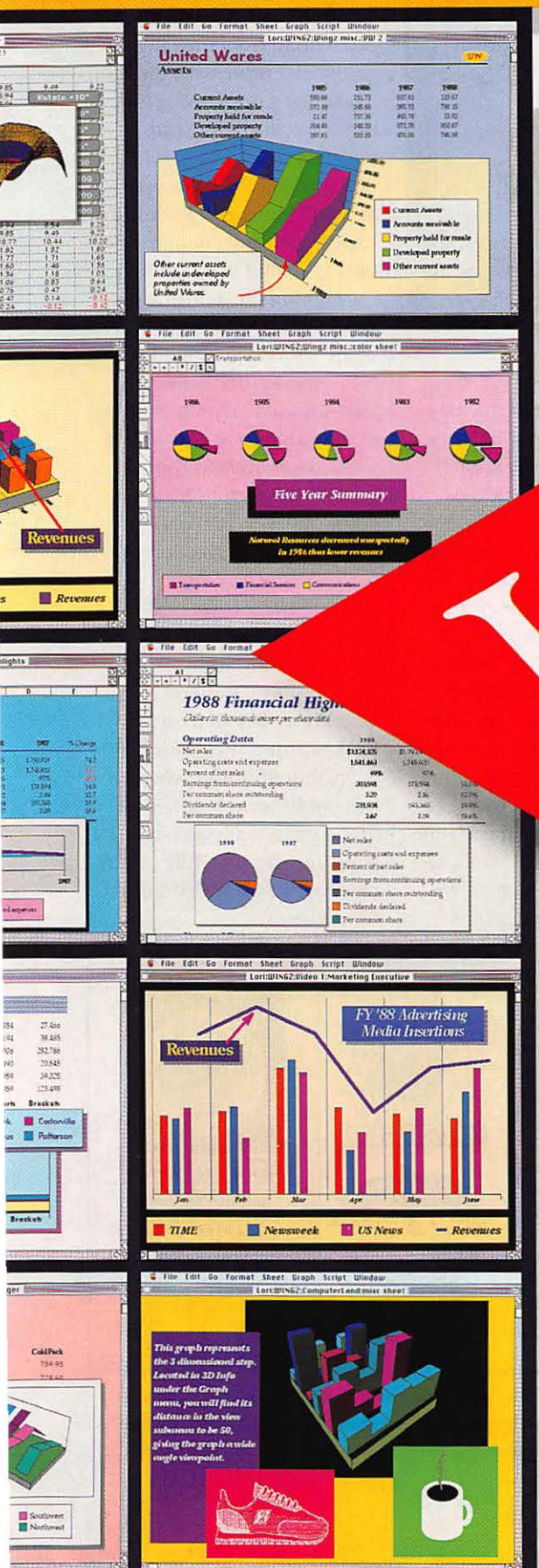
Making the game more vivid are the lifelike dossiers of the various personalities. Not only do they reflect the voluminous research involved in the game (one consultant was Gasperini's brother, a journalist covering Nicaragua), but they even have memorable, digitized photos of the characters. Many of these characters are real-life Central Americans, but some dwell closer to home; for instance, one "general" is actually a doorman on New York's Upper West Side.

Although some prospective publishers complained of the game's alleged right-wing viewpoint, while others claimed it sides with the left,
(continues)



As successor to an imaginary Latin American strongman, you walk the political tightrope in Springboard's new game, Hidden Agenda, the first of a series set in hot spots around the world.

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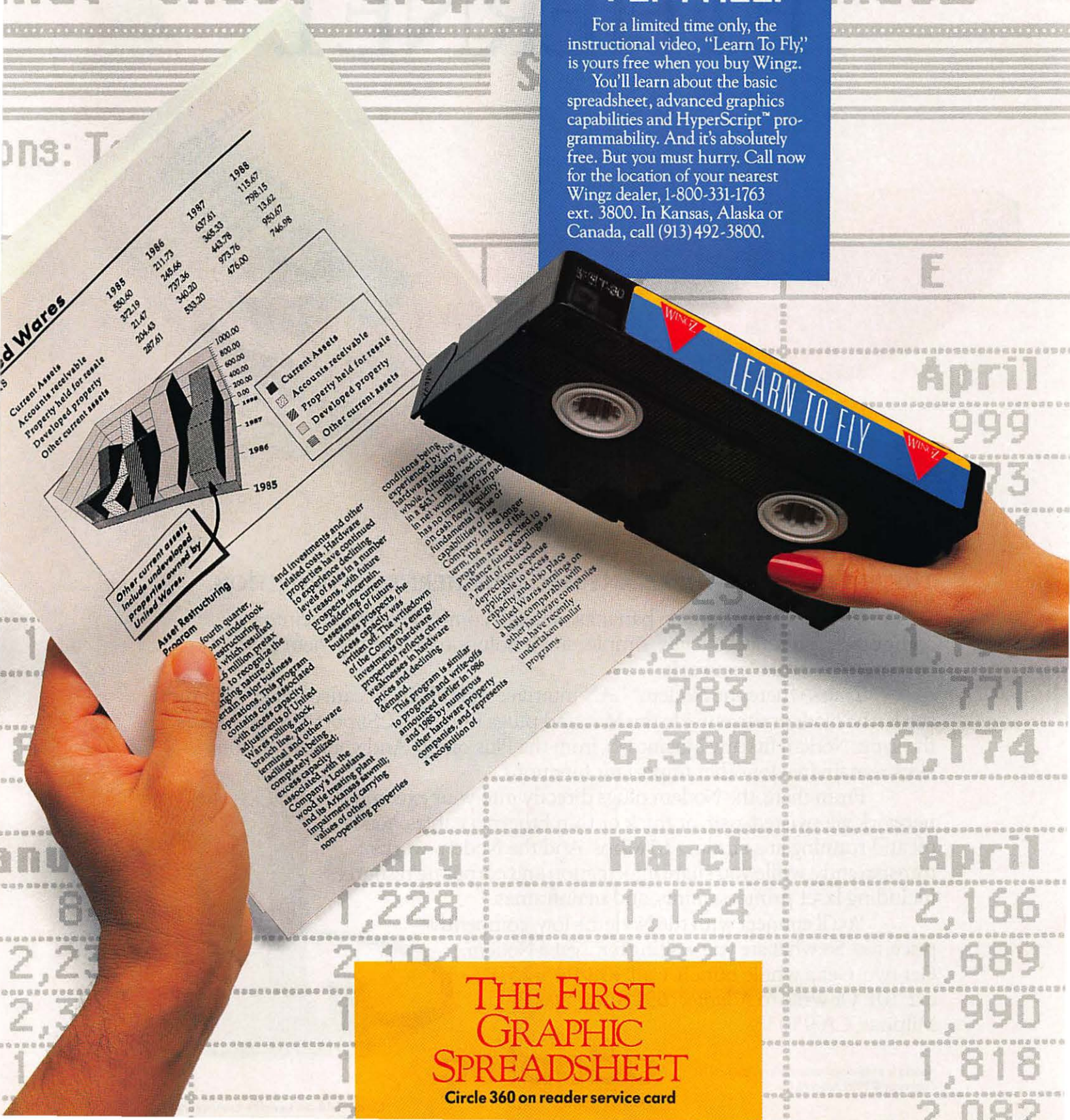
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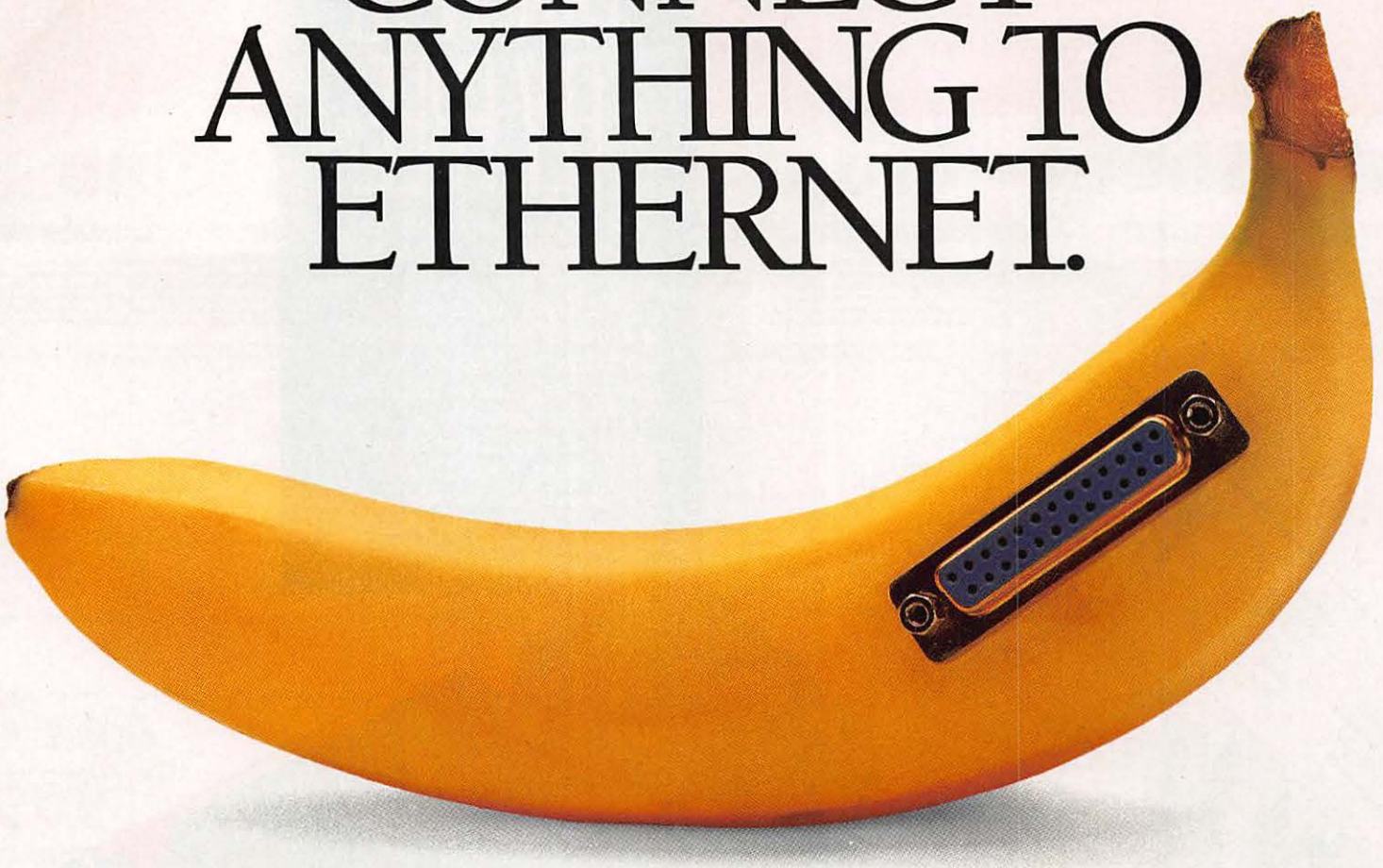
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everybody wanted it. According to Martinez, it's kind of a Rorschach that sparks endless discussions. The game is scheduled for first quarter release at a retail price of $59.95. Future games designed by Trans Fiction Systems and sold by Springboard will deal with the political conundrums of modern African states, moderate Arab nations, and Eastern bloc countries in the age of *perestroika.* For more information call Springboard Software, in Minneapolis, Minnesota, at 612/944-3915.
—*Steven Levy*

Groupware from Farallon

Farallon Computing has moved to new digs in Berkeley and is working on communications products, including one that lets you send files in the background over AppleTalk, and a groupware document-editing program.

Version 2.2 of Timbuktu will include some of the features found in Timbuktu/Remote; it will enable two or more Macs to work simultaneously on the same document, for example. In addition, though, you'll be able to send files in the background to other Timbuktu users over an AppleTalk network. And since these files will be deposited in folders that bear the sender's name, you'll have the underpinnings of a simple, yet effective, electronic mail system.

Another groupware product, a document-editing program tentatively called Annotator, should be out shortly. This program can add text and graphic notes to any document that's saved in Annotator's format (similar to the way that Glue works). You'll also be able to add recorded speech notes if you have Farallon's MacRecorder. For more information, call Farallon Computing, in Berkeley, California, at 415/849-2331.
—*Dave Kosiur*

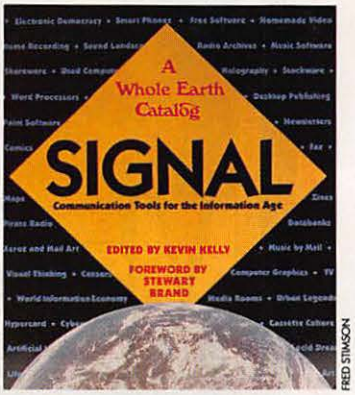


ROBERT HOLMGREN

Groupware group: Fred Huxham, Joe Sensendorf, Tom Rielly of Farallon Computing, which debuted document-editing software.

A Signal of the Times

Whoever decided that baseball was the national pastime evidently failed to consider the catalog. Catalogs are everywhere, they've adapted to all seasons, and everyone reads them. Some catalogs, of course, attempt to promote worldviews. L.L. Bean's catalog comes to mind, as do offerings from Eddie Bauer, Banana Republic, and The Chicken Boy. But the catalog I turn to for a true gestalt is *Signal: Communication Tools for the Information Age,* a Whole Earth Catalog edited with conviction, style, and wit by Stewart Brand's protégé, Kevin Kelly. This is the catalog for people who traffic in information. Written and assembled by self-described young mavericks, *Signal* "sizes up equipment and ideas," evaluating books, tapes, hardware, software, online services, and more informational thingamajigs than you can shake a comprehensive index at—and this book has one of those, too.



FRED STIMSON

The Whole Earth crew's new book, *Signal,* surveys the mind-altering substance of the eighties: information.

Signal was designed on a network of Mac SEs and one overworked LaserWriter, so it seems strange that the catalog's treatment of the Mac and related products is rather sparse. Nevertheless, you will find recommendations for Mac books and periodicals, HyperCard stacks and development tools, and several paragraphs extolling the virtues of the Mac SE—the latter nestled in an article titled "Ten Paths to Computer Purchases."

Interspersed in this network of goods and services for conscripts of the information age are numerous insightful essays on everything from desktop publishing to performance art. Browsing *Signal,* I learned about remote imaging, mail-order etiquette, and how to get *Pravda* (in English) delivered to my doorstep 365 days a year (for only $630).

And *Signal*'s hefty, too. "Those who wield information will shape the world," says the book's back cover. *Signal* is 10½-by-12 inches in size, made of quality paper, and weighs a good 2 pounds. I'd say that the person wielding this book will be stiff competition.

Signal is published by Harmony Books in New York; it costs $16.95, or $15 direct from Whole Earth Catalog, 27 Gate Five Rd., Sausalito, CA 94965; 415/332-1716.
—*William Freais*

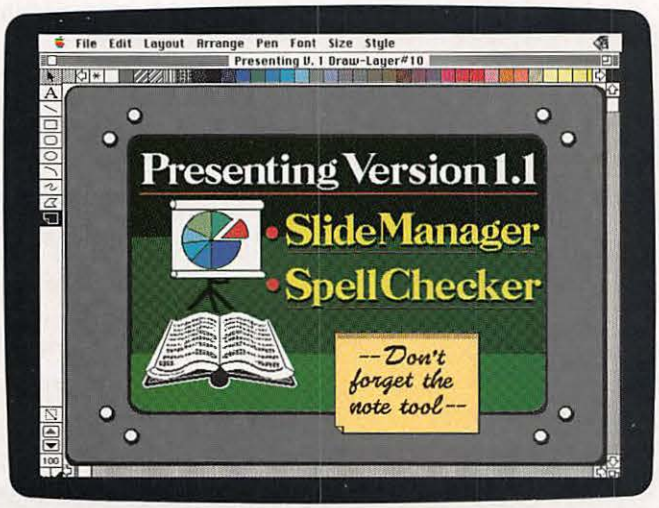
VideoMaker

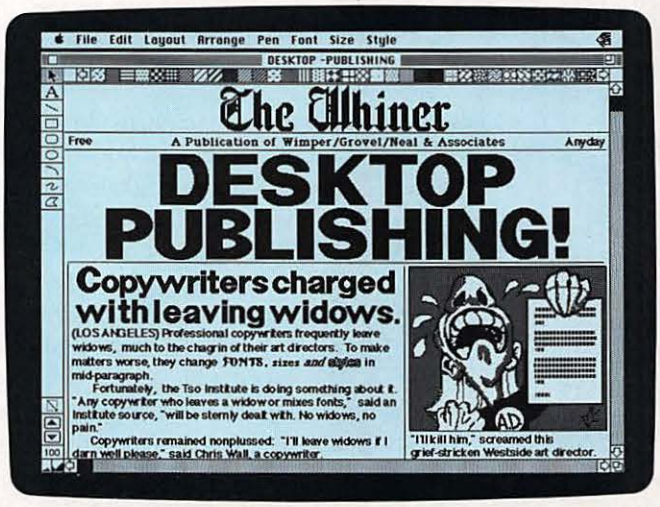
Eli Hollander, head of the film department at the University of California at Santa Cruz, has created a Mac-based video edit control program, VideoMaker, which runs on a Plus or SE.

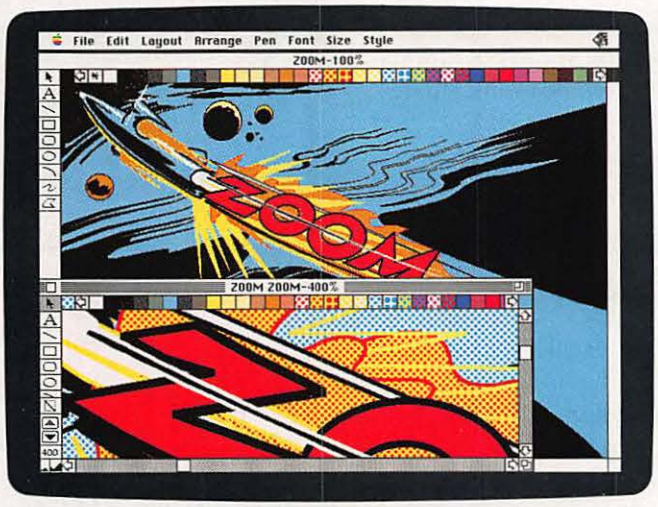
VideoMaker interfaces with a black box from Video

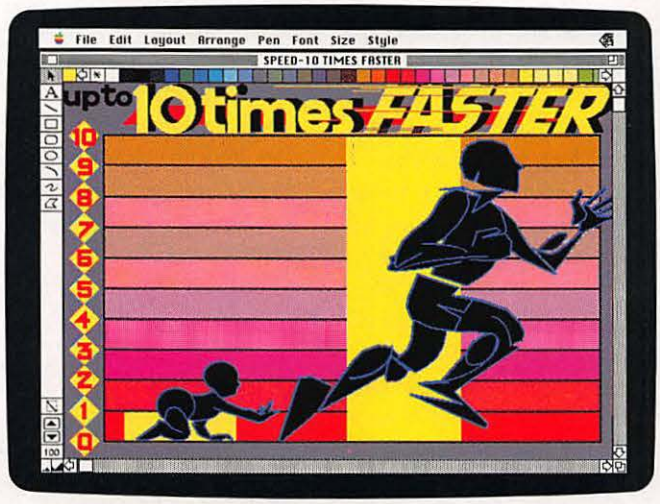
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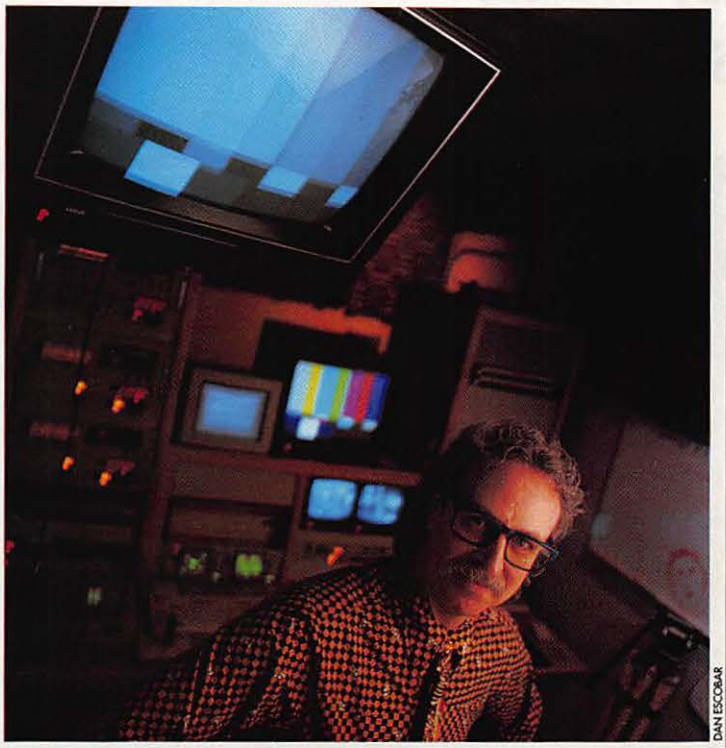




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DAN ESCOBAR

Filmmaker Eli Hollander created a custom video editing control station he runs from a Mac Plus or SE equipped with a joystick.

Media and can run industrial, broadcast, or VCR and VTR machines (such as the Panasonic 7500 or BetaCam). The VideoMaker interface provides dialog boxes for prompts and a single-window screen display. The system is capable of setting up video playback machines for switching and split edits, designed for cuts only or A/B rolls, and is controlled using a joystick, mouse, and three keys. Hollander has included features that will appeal to the filmmaker working with video, such as automatic reel numbering in SMPTE time code. The user can control two source machines, one record machine, and two or more auxiliary machines. This system offers the capabilities of certain online controllers, but is intended as an offline tool for the independent producer.

There are nearly a dozen edit controllers available that run on Mac or IBM systems, but Hollander's was developed to satisfy his own creative filmmaking needs. For more information, contact VideoMaker in Santa Cruz, California, at 408/429-8332.
—Stuart Cudlitz

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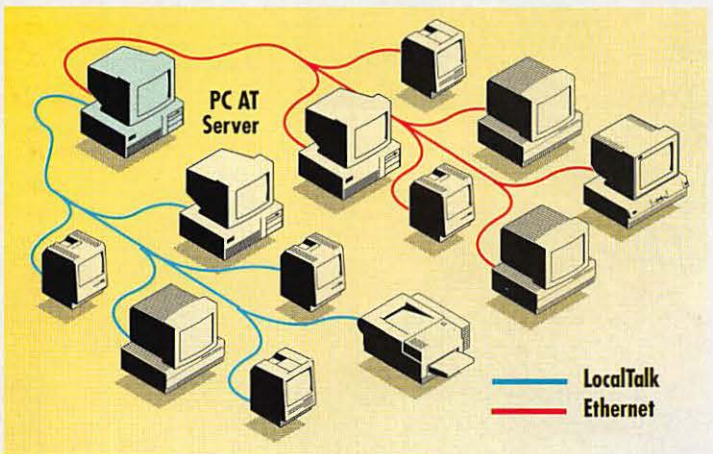
Installing a network of Macintoshes and IBM PCs can be a daunting task, particularly when the number of workstations reaches 50 or 100. Add to this the prospect of dedicating a few Mac IIs as file servers, and the costs begin to skyrocket.

But Dayna Communications has devised DaynaNet, a $1249 network operating system that may be just the solution. The only catch for Mac users may be the fact that it requires a PC AT as file server—hardware half as costly as a Mac II but perhaps not as friendly.

DaynaNet, which consists of software for the server and an add-in board that lets the PC attach to an AppleTalk network, provides file service to up to 100 devices. No add-in boards are necessary, since AppleTalk is already built into every Mac. Of course, you'll need additional add-in boards to attach IBM PCs, unless you choose to run Ethernet at 10 megabits per second. The system is also compatible with Dayna's AppleTalk accelerator products, which boost the data-transfer speed to 850 kilobits per second for the Mac and 1.7 megabits per second for an IBM PC. As with other network operating systems, DaynaNet users can share files, printers, modems, and applications, and send electronic mail.

DaynaNet's interface looks a lot like AppleShare and is billed as complying fully with Apple Filing Protocol, Apple's standard for networking. That's what makes DaynaNet look like such a good deal. AppleShare normally requires that you dedicate a Mac as a file server, and if the network is going to get a lot of use it's probably going to have to be a Mac II. TOPS, a distributed network, doesn't require a file server; however, at $189 per workstation, that approach can get pretty expensive. And even then, a network administrator might decide to dedicate a file server to improve performance.

Since Novell Netware for the Mac is the basis for DaynaNet, buyers of DaynaNet can upgrade to this fully compatible product. Much of the look of DaynaNet is identical to that of Netware. So if the network grows beyond 100 devices, or if you need System Fault Tolerance or other advanced network functions not supported by DaynaNet, you can upgrade to Novell and the network interface will look virtually the same to the users.
For more information, contact Dayna Communications in Salt Lake City at 801/531-0600.
—Laurie Flynn



DaynaNet, a network operating system based on Novell's Netware, can handle up to 100 Macs and IBM PCs through an IBM PC AT file server equipped with a board that supports AppleTalk.

(continues)

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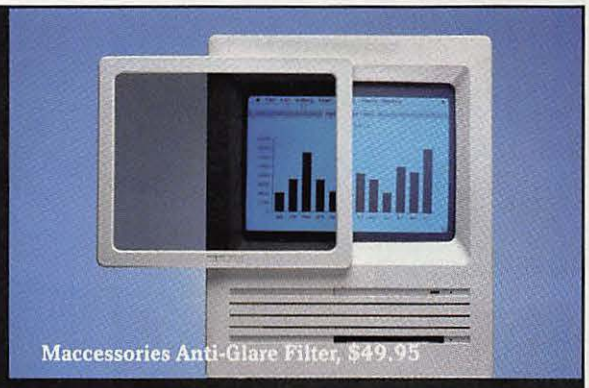


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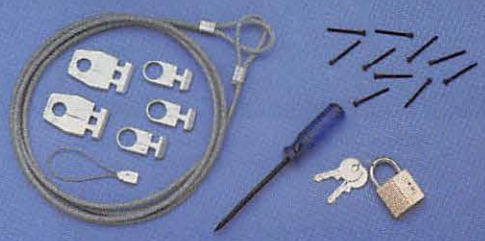


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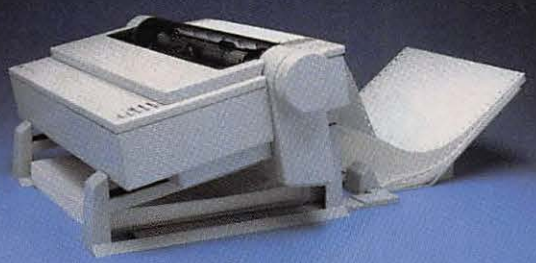
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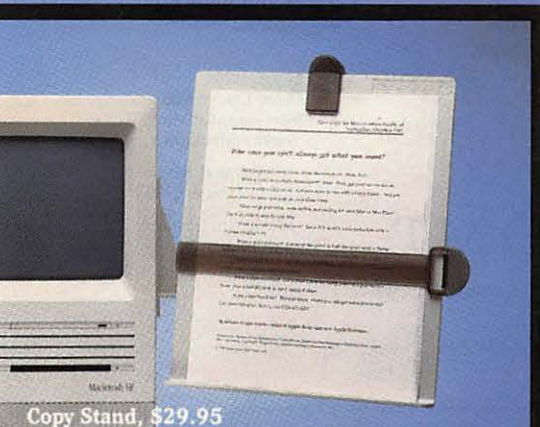
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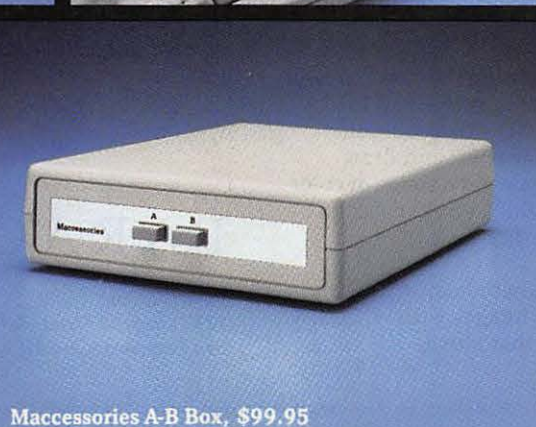
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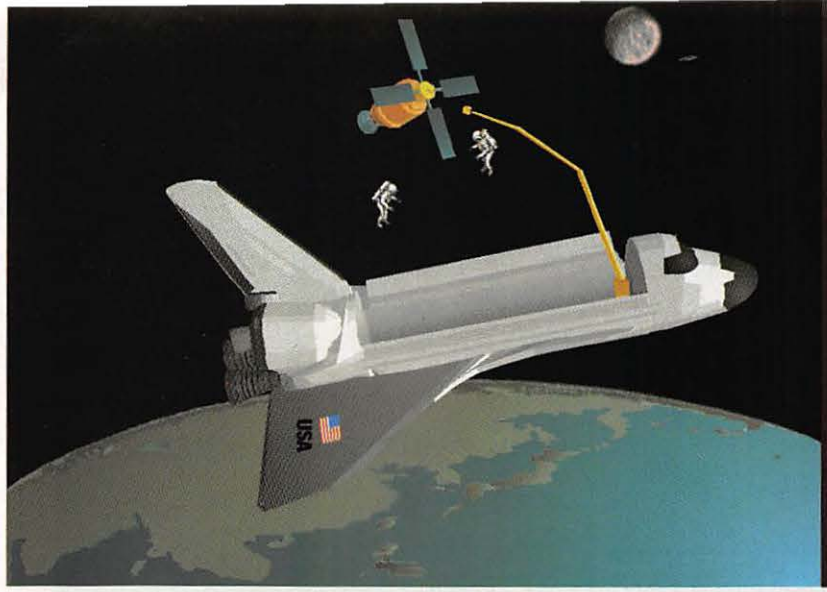
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David Peltz, MacWorld



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Suggested Retail Price: $395

Minimum System Requirements: 1 meg

PARACOMP

Paracomp, Inc.
123 Townsend Street, Suite 310
San Francisco, CA 94107, 415-543-3848

Swivel 3D is a trademark of Young Harvill/VPL Research, Inc. Other brand and product names are trademarks or registered trademarks of their respective holders.

Circle 213 on reader service card

ColorSpaceFX Supports Video

Interested in full-motion video on the Mac II? The ColorSpaceFX board from Mass Microsystems captures live video images in full color at 30 frames per second (real-time). The board enables you to create special effects including mirroring, kaleidoscoping, horizontal and vertical flipping, sharpening and blurring, zooming in and out, and squeezing or anamorphically distorting the image.



Curing the defense budget the easy way, with ColorSpaceFX special effects.

A Shrink feature lets you display a flicker-free video image in a HyperCard window. Because the video signal stays in analog form, it can run at the same time as other computer programs without slowing down the system. That means, for instance, you can watch "Star Trek" in one window while working in FullWrite in another.

The board also supports multiple video standards. ColorSpaceFX inputs from any NTSC, PAL, or SECAM video device: you can input from a European-standard laser disk, a North American–standard camera, and a Japanese-standard broadcast signal and switch between them.

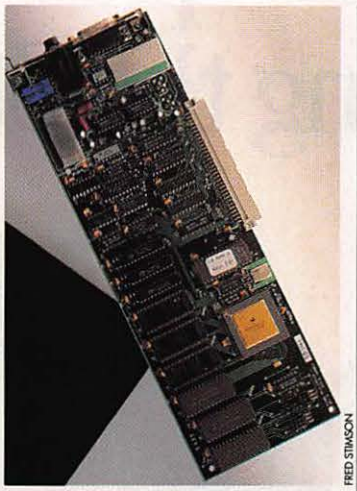
To output to videotape or videodisk, you will need the ColorSpace II, a $1995 genlocking graphics overlay video board. The ColorSpace II can also digitize FX video images for manipulation within paint programs. Slated to ship in the second quarter of 1989, the ColorSpaceFX board will sell for $2995. For further information, contact Mass Microsystems in Sunnyvale, California, at 800/522-7979 or 408/522-1200.

—Allan Lundell

MacMusicFest 2.0

Over 1500 musicians, entertainment-industry professionals, and computer visionaries attended 1988's MacMusicFest festival. As in 1987, the MacMusicFest was held on the lot of Paramount Pictures.

Hot product introductions included the first public showing of Resonate's new MIDI sequencer, Portrait, designed by Greg Jalbert (who wrote Listen) and Geoff Brown (who wrote Deluxe Music Construction Set). Apriori showed a DA rhyming dictionary that will be a must-have for songwriters, lyricists, and poets. At the Apple booth, Zero One was showing a DA-based editor for the Roland D-50 synthesizer running on top of popular sequencers—the combination permits sound editing during MIDI sequencer playback.



FRED STIMSON

Digidesign's Sound Accelerator board speeds Mac sound processing.

Digidesign stole the show by previewing its Desktop Audio Production System, consisting of the Sound Accelerator Digital Audio Card (Mac II– or Mac SE–compatible), AD In Analog-to-Digital Converter, and Sound Designer II's Digital Audio Editing Software. For less than a quarter of the price of similar systems, Digidesign can turn the II or SE into a complete digital audio workstation capable of real-time sound synthesis and digital signal processing, direct-to-hard-disk recording, polyphonic MIDI-triggered sample playback, and sophisticated sound editing. The board conforms to CD quality specs: 16-bit samples at 44.1kHz. Digidesign even provides an XCMD for true 16-bit sound playback from HyperCard.

Apple Computer, Filmsonix, and the Record Plant, sponsors of MacMusicFest, are considering holding a MacMusicFest in the summer of 1989 in San Francisco.

—Christopher Yavelow



Synth-Bank president Bryan Bell, Apple Fellow Alan Kay, musicians Herbie Hancock and Christopher Yavelow, and MacMusicFest seminar host Jeff Burger attended the MacMusicFest.

X Window Graphics on the Mac

Big-league graphics, the kind developed on hot-shot UNIX workstations, DEC VAX systems, and even IBM mainframes, have been beyond the reach of the Macintosh—until now.

Thanks to a new software utility from White Pine Software and some astute cooperation between Apple and Digital Equipment Corporation, the great graphics of the most powerful systems are available to even the most basic Mac Plus, SE, or Mac II system.

The $499 utility is called eXodus version 1.0, and the capital *X* in the name stands for the key, MIT's X11 Window System. This system is a

(continues)

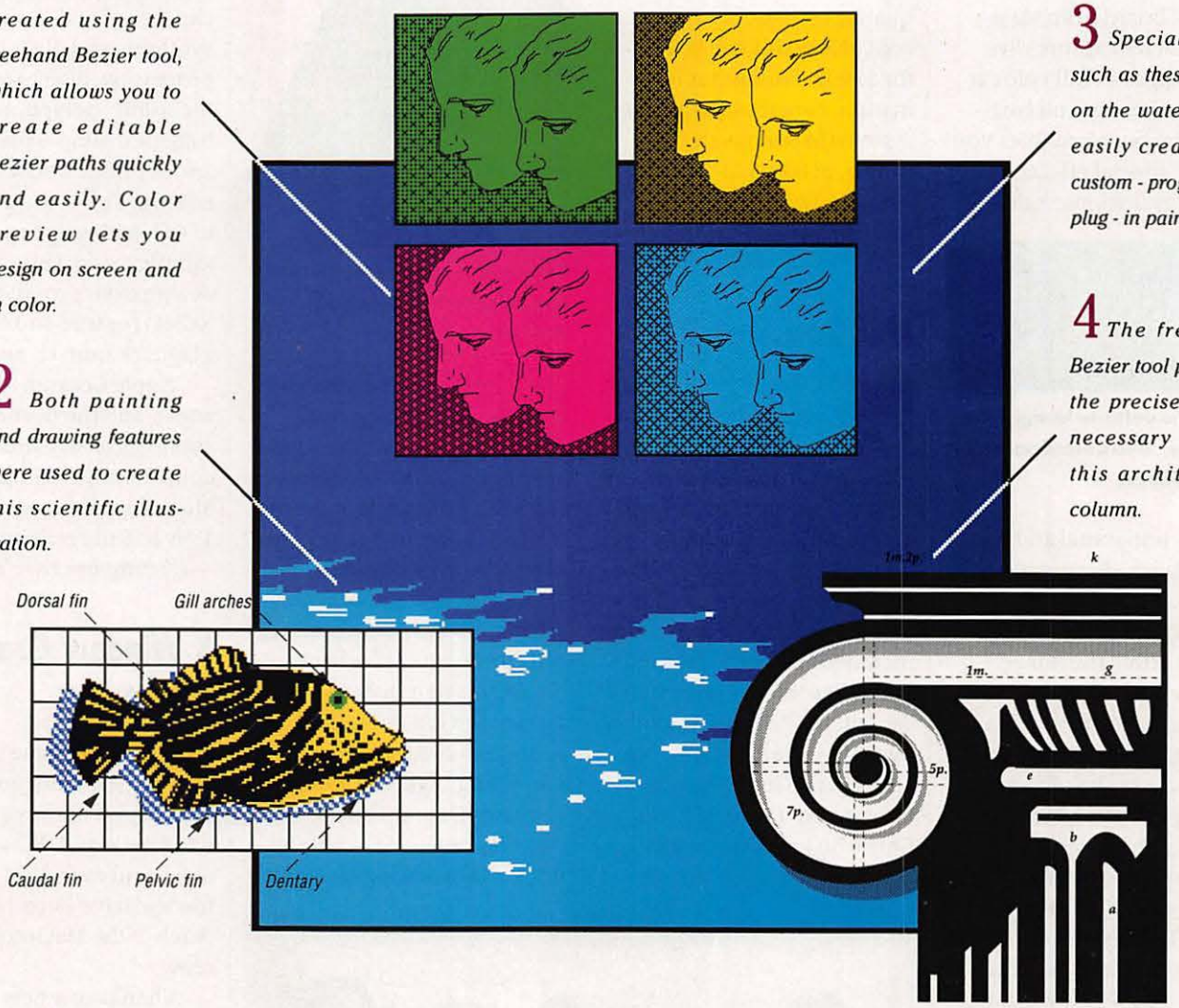
SuperPaint 2.0
Setting the Standard. Again.

1 *These faces were created using the freehand Bezier tool, which allows you to create editable Bezier paths quickly and easily. Color preview lets you design on screen and in color.*

2 *Both painting and drawing features were used to create this scientific illustration.*

3 *Special effects, such as these bubbles on the water, can be easily created with custom - programmed, plug - in paint tools.*

4 *The freehand Bezier tool provided the precise control necessary to draw this architectural column.*



SuperPaint, the best-selling graphics program for the Macintosh®, has always set the standard against which other software is compared. And we just raised that standard.

In Version 2.0, SuperPaint gives you more graphics power than the costly "professional" drawing programs, yet it's easier to use. Draw spontaneously with the freehand Bezier tool, for example. You don't have to get it perfect the first time — the Bezier path is completely editable, so you can progressively refine your work. Or use AutoTrace™ to instantly convert any bitmapped image to an object-oriented line drawing.

Then, with a mouse click, you can further refine your graphic with the most flexible and sophisticated painting tools available on the Mac, including a slick new airbrush that works just like the real thing. Plug-in paint tools can be custom-programmed and will show up in the tool palette.

We've added nearly all the other features you wanted, too. You can set any document size for printing multiple pages, work in landscape view, or use SuperBits™ to edit bitmaps of any size and resolution — you can even edit a full page at 300 dpi. Plus you can preview your image in color before printing.

More power, more flexibility, *and* easier to use. That's SuperPaint 2.0 — setting the standard for Macintosh graphics...again.

Suggested retail price: $199. Upgrade from 1.0 or 1.1: $50.

System requirements:
Macintosh Plus, SE or Macintosh II;
System 6.0 or later

Silicon Beach Software, Inc.
P.O. Box 261430
San Diego, CA 92126 • (619) 695-6956

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SILICON BEACH
SOFTWARE

Circle 266 on reader service card

bitmapped graphics language used by the majority of workstation vendors, including DEC, IBM, Hewlett-Packard, Apollo, and even as an alternative on Sun workstations.

Accessing graphics-and-text remote databases on these machines and bringing the graphics home to the Macintosh is what eXodus is all about. It won't magically turn your 9-inch screen into a megapixel display, but it actually makes it possible to view a high-resolution display in segments.

According to White Pine's vice president of engineering



eXodus brings high-end workstation graphics to the Mac.

Terrell Mitchell, the amount of graphics detail that you see on screen depends upon how much RAM you can dedicate to supporting the X Window. You'll lose some resolution if you have only 1MB of RAM; if you have more, you'll see more.

You will also need a network connection to the larger system. The eXodus utility supports the three most popular network communications protocols used by X Window–based systems: AppleTalk, DECnet, and TCP/IP.

The Mac operating system interface controls eXodus, which in turn provides X Window services within the familiar Mac framework. Users will be able to view the X Window as just another application on the Mac.



DRAKE SOREY

Rapport plugs into a Mac 512KE, Plus, or SE and lets you read files from, and write files to, 3½-inch IBM disks.

Version 1.0, which provides monochrome graphics, will be available this quarter. Educational pricing and site licenses are also available. White Pine Software, Amherst, New Hampshire, 603/886-9050.
—*Martin Marshall*

MS-DOS Rapport

Mac vendors have finally gotten the message that users really want to be able to easily access data on DOS disks and transport it into Mac applications, rather than run Lotus's 1-2-3.

Aside from Apple's SuperDrive, there is now something altogether new to make this possible: Rapport, a $295 device from Kennect, lets Macintosh users read DOS files. A mouse-size module that plugs into the external floppy drive port, Rapport (unlike the SuperDrive) works with the Mac Plus, in addition to the 512KE and the SE.

Users with Rapport can read MS-DOS files from 720K disks using internal Mac drives, and both read and write Mac and DOS formats using 800K external drives. Like SuperDrive, Rapport works with Apple File Exchange, as well as with third-party translators such as DataViz's MacLink Plus.

Rapport also expands the 800K capacity of Mac drives to 1.2MB. Rapport provides almost all the important features of SuperDrive, which stores up to 1.4MB.

Rapport is one of the least expensive ways to read files in DOS format. The only possible drawback is that it supports only 3½-inch disks, and many DOS users still use 5¼-inch disks.

Kennect has also introduced a $495 external drive that provides up to 2.4MB of storage on high-density disks. Of course, since that's not a standard format on the Mac, the Drive 2.4 is especially useful for backing up hard disks. The Drive 2.4 sells for $495. For more information, contact Kennect Technology, in Campbell, California, at 408/370-2866.
—*Laurie Flynn*

The Making of Splat

Atman Motion Pictures is using the Macintosh extensively throughout the filming of *Splat,* an adventure movie. During production, the company is shooting a BetaCam video documentary that details the production's Mac applications.

Atman has used Screenplay Systems' Movie Magic Scheduling/Breakdown and Movie Magic Budgeting to

(continues)



CYNTHIA MOORE

On their current movie, producers John Carter and Glenn Owen are handling everything from scripting to music on their Macs.





Aside from being a tad easier to install than a satellite, the Hayes Smartmodem 2400M™ for the Macintosh® II and Smartcom II® for the Apple® Macintosh make up the most advanced communications system you can put inside a Mac.®

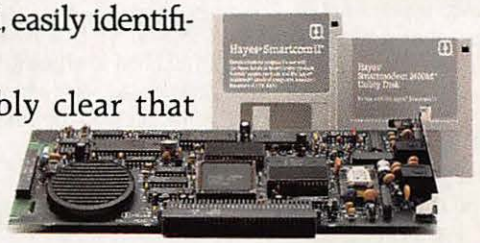
With this modem and software package, you can set up an extensive Macintosh computer work group system through a feature called HayesConnect.™ It allows any Macintosh access to the Smartmodem 2400M across an AppleTalk® Network. Which means all Macintosh computers on the Network will be able to communicate with or without

THE ONLY COMMUNICATIONS SYSTEM MORE ADVANCED THAN OURS WON'T FIT INSIDE YOUR MAC.



a modem of their own. This makes for extremely efficient office communications.

Then, to make them even more efficient, the system offers Smartcom II for the Macintosh. It's the only software designed to take full advantage of the power and graphics capabilities of all of the computers in the Macintosh family. For example, you can program your own on-screen buttons to create a personalized user interface. You also get features like moveable icons, custom color selection and full support of ImageWriter® and LaserWriter® for incredible graphics. You can even run the system unattended using an Autopilot feature. Of course, there is much more you can do with a few simple clicks on standard, easily identifiable icons.



By now it's probably clear that whether they're just used with the Macintosh II or shared by Mac computers on an AppleTalk Network, the Smartmodem 2400M and Smartcom II make a communications system that can't be beaten. At least not by anything on this planet.

Hayes®

For your nearest Hayes Advanced Systems Dealer, call **800-635-1225.**
Hayes Microcomputer Products, Inc., P.O. Box 105203, Atlanta,GA 30348.

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Get The Picture?



Illustration: Cynthia Marsh

IF you're not using the Microtek MSF-300G flatbed scanner in your design production, you're not getting the whole picture. This gray-scale scanner allows you to capture images and store them in your computer, where you can manipulate and print them out on a laser printer or phototypesetter.

See what you're missing.

Now you can size artwork right on your computer screen. So there's no more guesswork or waiting for position stats. Just scan the image, then stretch it or crop it as needed.

Artistic license to explore.

The Microtek MSF-300G flatbed scanner gives you the freedom to experiment with special effects and use gray-scale editing software to:

- Change screen patterns,
- Alter brightness and contrast,
- Drop type over or behind the image,
- Edit, move and resize artwork.

View all the layout possibilities right on your computer's screen and end up with camera-ready artwork in no time flat!

Read and write 600 wpm!

In addition to artwork, you can scan typewritten and printed copy into your system, then edit it with your word processing or desktop publishing software.

Just picture this:

The Microtek MSF-300G flatbed scanner provides:

- 14 brightness and14 contrast settings to help you retouch images and compensate for less than perfect originals.
- 12 different halftone patterns to increase your special effects options.
- Up to 256 shades of gray to give you true continuous tone quality images.
- Enough gray-scale information for a phototypesetter to produce magazine-quality halftones at up to 200 line screen.

Picture it yours!

To find out where you can get a Microtek MSF-300G flatbed scanner for your Apple Macintosh, IBM PC or PS/2, call **(800) 654-4160** or in CA **(213) 321-2121.**

The Microtek MSF-300G flatbed scanner-<u>now</u> you get the picture.



MICROTEK

680 Knox Street, Torrance, CA 90502

Circle 585 on reader service card

format the script in Word 3.01, as well as for preproduction budgeting and productionmanagement. VideoWorksIIanimatedstoryboards are used as references for previewing the compositing of actors into projected backgrounds, supplying critical timing and alignment information for real-time film composites using the Introvision system. After all the main footage for *Splat* is shot, Atman will use the Mac-based Edgewriter system to control transfer of the footage to video for editing; the final film will be cut to match the edited video version using Edgewriter's film-frames-to-video-time-code log sheets.

Every phase of the production will be documented to demonstrate the use of the Mac in making a cost-effective motion picture. After theatrical release of the feature film, the production documentary will be distributed to film schools and to the corporate market. For more information, contact Atman Motion Pictures in Newport Beach, California, at 714/851-3050.

—*Stuart Cudlitz*

Hypermedia Duck Mystery

At the Richardson Bay Audubon Center and Sanctuary in Tiburon, California, a unique educational project demonstrates the effectiveness of Macintosh-based hypermedia as a participatory learning tool. Working with Apple Computer (which provided the equipment and training), Lucasfilm (which did the programming), and a group of high-school students, the Audubon Center has created The Mystery of the Disappearing Ducks, an interactive video adventure. The team worked from scratch; although the tremendous potential of hypermedia, or interactive multimedia, has been the subject of much hype and hoopla for years, few practical implementations of it exist in the real world.

Disappearing Ducks uses a HyperCard stack, running on a Mac SE, to drive a videodisk player. The videodisk contains footage of interviews with ecologists, hunters, farmers, and others; views of migrating ducks and their environments; and more. The video footage is interwoven with the material in the stack. You navigate the stack, clicking on buttons that take you back and forth from computer screen to video screen in a fascinating interplay of information and action.



Through a HyperCard/video mystery, teenagers learn duck facts while discovering what's threatening waterfowl worldwide.


ED KASHI

What's up with the ducks? Beth Huning, director of the Richardson Bay Audubon Center, put students to work on the Mac to find out.

A striking opening sequence sets the tone for the engrossing, unpredictable action that follows. Digitized duck silhouettes on the Macintosh screen are suddenly mirrored by silhouettes on the video screen that turn into images of real, full-color flying ducks. The story revolves around the mystery of the title, which you have been asked to solve by Paul Parkranger. You click on various hidden buttons in the cabin—clippings on the bulletin board, a "pictaphone," a video player—to follow various paths in your quest to solve the mystery. Along the way, you learn quite a bit about why the duck population is declining rapidly. You may choose to explore the interview section and ask the various on-screen characters why the ducks are disappearing. You may want to watch one fascinating bit of footage over and over, or learn feather parts or duck-bill types, or perform a chemistry experiment to see how salt water affects freshwater plants. You can even interview the high-school students and find out how they came up with the concept for the story. The program is entirely activity-driven, rather than menu-driven; for example, you click on a picture of a person to see the video interview of that person.

Both children and adults enjoy it, but The Mystery of the Disappearing Ducks is intended for classroom use with small groups of high-school students. Although the current version is fully operable, and can be explored for hours, much remains to be added as funding becomes available. It is not yet installed in a classroom, but serves mainly to demonstrate the technology and its applicability to environmental education. For more information, call the Richardson Bay Audubon Center at 415/388-2525.

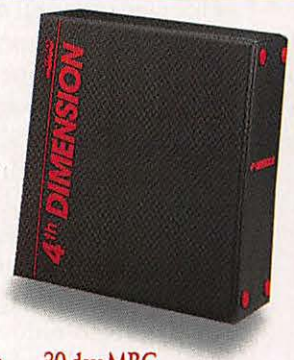
—*Felicity O'Meara*

Come what May.

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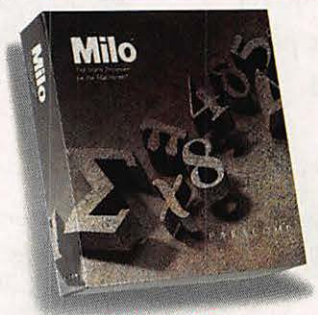
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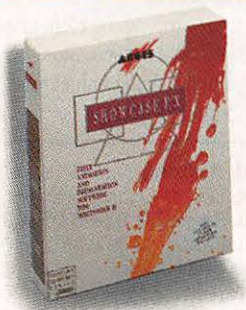
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4822 75 Stemple Garamond 125.
4823 76 Weiss 125.
4824 77 Garamond 3 125.
4825 78 Universal News Com/Greek 95.
4826 79 Avenir 1 182.
4827 80 Avenir 2 182.
4828 81 Bauhaus 125.
4829 82 Antique Olive 125.

Aldus
1330 Freehand 2.0 349.
4751 Persuasion 1.0 389.
1331 PageMaker 3.01 399.

★Altsys ... 30 day MBG
1195 Fontographer 2.4.1 *(CP)* 229.

Broderbund
4465 DTP Advisor 1.0 47.

940C

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MacConnection™ 1-800/622-5472

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Zedcor ... 60 day MBG

ZBasic 5.0–The Mac's fastest Basic compiler just got better with complete toolbox support, a program generator and hundreds of example programs..... $99.

★Casady & Greene ... 60 day MBG

MacConnection carries the entire collection of Fluent Laser Fonts ea. 46.

4839 Vivid Impressions..... 69.
4838 Quill Pack *(Vol. 8 & 20)*..... 105.
4836 Headline Pack *(Vol. 10-12)*..... 145.
4837 Modern Pack *(Vol. 7, 14-18)*.....195.
4834 Distinctive Pack *(Vol. 8, 19-22)*.... 195.
4833 Classic Pack *(Vol. 3-6, & 13)*..... 195.

Cricket Software

1668 Cricket Graph 1.3..... 115.
1670 Cricket Presents 2.0..... 289.

Letraset

2621 Ready,Set,Go! 4 4.5..... 275.
2619 Image Studio 1.5..... 275.
4709 LetraStudio 1.0..... 289.

★Microsoft ... 30 day MBG

2878 PowerPoint 2.01..... 255.

Postcraft International

3157 Laser FX 1.6..... 109.

Quark

4621 QuarkStyle 1.0..... 199.
3230 Quark XPress 2.0..... 499.

★Softstream, Inc. ... 60 day MBG

4996 UltraSpec 1.0..... 95.

Springboard

3530 Certificate Maker 2.0..... 24.
4497 Top Honors..... 59.
4500 Springboard Publisher 1.0..... 109.

★T/Maker ... 30 day MBG

3635 EPS Illustrations..... 75.

PROGRAMMING & HYPERMEDIA

★Beacon Technology ... 30 day MBG

4967 HyperBible *(King James)*..... 159.
4968 HyperBible *(New International)*... 195.

Borland International

1511 Turbo Pascal 1.1..... 68.

★Bright Star Tech. ... 30 day MBG

3962 HyperAnimator 1.5 *(includes Stax, a MacConnection exclusive!)*..... 99.

★DreamMaker ... 60 day MBG

4115 MacGallery *(HyperCard format)*... 27.

Ideaform

2418 HyperBook Maker 1.0..... 31.

Individual Software

4719 101 Scripts & Buttons for Hypercard $37.

★Manx Software ... 60 day MBG

4068 Aztec C 3.6B..... 65.
4317 Aztec SDB..... 65.
4316 Aztec C UniTools..... 65.
4069 Aztec MPW C 3.6B..... 99.
4075 Aztec C + SDB 3.6B..... 99.

★Microsoft ... 30 day MBG

4471 QuickBasic 1.0..... 65.

★OWL International ... 30 day MBG

3082 Guide 2.0..... 99.

★SmethersBarnes ... 30 day MBG

1478 Prototyper 2.0..... 149.

Softworks, Inc.

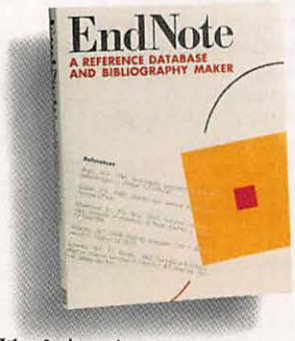
4601 Stack Cleaner..... 29.
4599 HyperTools #1..... 59.
4600 HyperTools #2..... 59.

★Symantec ... 30 day MBG

4644 Just Enough Pascal 1.0..... 49.
3421 Lightspeed Pascal 2.0..... 85.
3420 Lightspeed C 3.01..... call

TENpoint0

1338 Reports! 1.2..... 69.
4638 Focal Point II 1.0..... 119.



Niles & Associates

EndNote 1.1.1–Stop typing bibliographies! EndNote will do it for you. Stores 32,000 references. Adds bibliographies to all major word processor documents..... $82.

★TML Systems ... 30 day MBG

3548 TML Source Code Library II 1.1... 42.
4989 TML Pascal II 3.0 *(w/o MPW 3.0)*... 59.
3549 TML Pascal II 3.0 *(w/MPW 3.0)*... 115.

True BASIC, Inc.

3587 True BASIC 2.01..... 59.

★Zedcor ... 60 day MBG

3985 ZBasic 5.0..... 99.

UTILITIES

★Affinity Microsystems ... 60 day MBG

1014 Affinifile 1.1..... 46.
1016 Tempo II 1.0..... 89.

★Berkeley System ... 30 day MBG

1541 Stepping Out II 2.01..... 52.

Beyond, Inc.

4203 MenuFonts 2.02..... 29.

★Casady & Greene ... 60 day MBG

2269 QuickDEX 1.4A..... 32.

★CE Software ... 60 day MBG

1727 CalendarMaker 3.0..... 27.
1728 DiskTop 3.0.4..... 27.
4689 MockPackage Plus Utilities 4.4... $27.
1729 QuicKeys 1.1..... 53.

Dubl-Click Software

1824 Calculator Construction Set 1.04... 35.

Electronic Arts

1843 Disk Tools Plus 1.01..... 31.

★Farallon Computing ... 30 day MBG

4684 ScreenRecorder 1.0..... 135.

★Fifth Generation ... 60 day MBG

4287 Pyro! 3.0 *(screen saver)*..... 15.
3954 PowerStation 2.5..... 32.
3955 Suitcase II 1.2..... 45.
3953 FastBack Mac 1.3..... 54.

★FWB Software ... 30 day MBG

2232 Hard Disk Partition 2.0..... 41.
4683 Hard Disk DeadBolt 1.0..... 53.
2231 Hard Disk Util 2.03..... 53.

★HJC Software ... 30 day MBG

4803 Virex 1.3..... 69.

ICOM Simulations

4084 On Cue 1.3..... 36.

Ideaform

2419 DiskQuick 2.10..... 27.
2420 MacLabeler Plus 3.0..... 42.

★Kent Marsh Ltd. ... 30 day MBG

2591 The NightWatch 1.02..... 87.
2592 MacSafe 1.08C..... 87.

★Lundeen & Assoc. ... 60 day MBG

2683 WorksPlus Command 2.0..... 57.

MEDIAGENIC

4591 Open It! 1.0..... 49.

★Microlytics ... 60 day MBG

2732 GOfer 1.0..... 44.

★Microseeds Pub. ... 60 day MBG

4848 INITPicker..... 29.
4210 Screen Gems 1.0..... 47.
2913 Redux 1.5..... 59.

★Olduvai Software ... 60 day MBG

4503 MultiClip..... 36.
3031 Icon-It! 1.1..... 39.
3030 FontShare 1.1..... 149.

★PCPC ... 30 day MBG

3175 HFS Backup 3.0..... 54.

★Solutions, Intl. ... 60 day MBG

3448 SmartScrap & The Clipper 2.0.... 46.
3449 SuperGlue 1.05..... 50.

★SuperMac Software ... 60 day MBG

3383 SuperSpool 5.0..... 54.



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DAtabase 1.01–A full-featured database for text, color images, and graphics, all within a desk accessory. Includes extensive importing & exporting functions as well as on-line help . $75.

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3382 SuperLaserSpool 2.0 $79.
3378 Multi-User SuperLaserSpool 2.0 . . 199.
3377 Diskfit 1.5 54.
3379 Network Diskfit 1.5 199.
3381 Sentinel 2.0 *special* 149.

★Symantec ... 30 day MBG

4728 MacSQZ! 1.05 52.
4729 S.U.M. 1.02 65.

★Symmetry ... 30 day MBG

3318 HyperDA 1.1 35.

★Williams & Macias ... 30 day MBG

3783 myDiskLabeler w/Color 2.9l 31.
3784 myDiskLabeler w/LaserWriter 2.9LI . . 34.
4976 Sticky Business 1.0. 99.

Working Software

3788 Findswell 2.0 36.

WORD PROCESSING

★Access Technology ... 60 day MBG

3959 MindWrite 2.1 95.
4109 MindWrite*Express* 2.1 139.

★Aegis Development ... 60 day MBG

1133 Word Tools 1.2 42.

Ashton-Tate

1324 FullWrite 1.0 269.

Claris

1129 MacWrite 5.0 99.



PBI Software

NetTrek–The Real Version–Space battle against the computer or up to five networked users. Color, digitized sounds, fully interactive. Written by Randy Carr. $35.

★Deneba Software ... 30 day MBG

4700 BigThesaurus *(1.4 million words)* . . 54.
1767 Comment 2.0 54.
1768 Coach Professional 3.0A. 105.

★Lundeen & Assoc. ... 60 day MBG

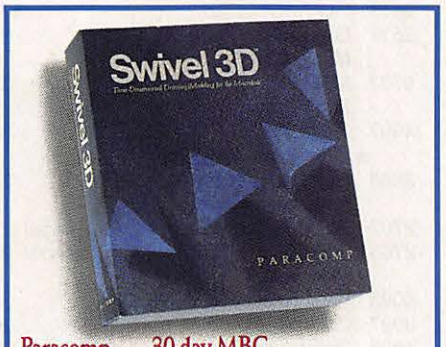
2684 WorksPlus Spell 2.0 46.

★Microlytics ... 60 day MBG

2733 Word Finder 2.0 33.
4870 Electronic WordFinder 220 79.

★Microsoft ... 30 day MBG

2885 Write 1.0. 79.
2882 Word 4.0. 255.



Paracomp ... 30 day MBG

Swivel 3D 1.0–The fastest, top-rated, color drawing and modeling program for the Mac. Innovative linking feature allows you to build realistic 3 dimensional images with naturally moving parts. 5 Mice, March '89 MacUser! $249.

Niles & Associates

4602 EndNote 1.1.1 82.

★Preferred Publishers ... 30 day MBG

4781 Vantage 1.0 59.

★Sensible Software ... 30 day MBG

4692 BookEnds 1.0. 53.
3375 Sensible Grammar 1.1D 53.

Software Discoveries

3374 Merge Write 1.0 34.

★Symantec ... 30 day MBG

3422 More II 2.0 255.

★Symmetry ... 30 day MBG

4504 Acta Advantage 1.0 65.

★T/Maker ... 30 day MBG

3639 WriteNow 2.0. *special* 99.

WordPerfect

3800 WordPerfect Mac 1.0.1 179.

Working Software

3792 Spellswell 2.0G. 45.
4693 Quick Letter 1.0 75.

MUSIC & EDUCATION

★Ars Nova ... 60 day MBG

1215 Practica Musica 2.1 75.

★Bogas Productions ... 60 day MBG

4255 Super Studio Session 2.0 75.
1461 Studio Session 2.0 49.
1458 Country Disk. 15.
1459 Heavy Metal Disk 15.
4832 Sound Effects Disk 15.
1460 String Quartet Disk 15.
4831 Music Disk 4 Pack Special 39.

★Bright Star Tech. ... 30 day MBG

1402 Alphabet Blocks 3.01 32.
3961 Talking Tiles 1.0 69.

Broderbund Software

4314 Type! 1.0. 20.
1423 Jam Session 1.1 *(CP)*. 30.
1422 Geometry 1.0 *(CP)*. 59.

4067 Calculus 1.0 *(CP)*. $59.

Coda Music Systems

4367 MacDrums 1.01 *(CP)* 32.
4483 Perceive 1.0 52.

Davidson & Associates

1734 Math Blaster! 1.0 *(CP)*. 27.
4978 Speed Reader II 1.0 *(CP)* 36.

Electronic Arts

3941 SmoothTalker 2.0 33.
3939 MathTalk. 33.
3935 Speller Bee. 33.
4619 Mavis Beacon Typing 1.2B 35.
1846 Deluxe Music Construction Set 2.5 . 85.

★Farallon Computing ... 30 day MBG

2199 MacRecorder 1.1 135.

★Great Wave ... 30 day MBG

2277 TimeMasters 1.0. 22.
2276 KidsTime 1.2 26.
2270 American Discovery 2.1 27.
4334 NumberMaze 1.0 27.
2273 ConcertWare+ 4.0 39.
2271 ConcertWare+ MIDI 4.0 79.

Individual Software

4209 Typing Instructor Encore. 26.

Learning Company

2670 Reader Rabbit 2.0 *(CP)*. 32.

Mindscape

2748 The Perfect Score: SAT 1.0 46.

★Personal Training Sys. ... 60 day MBG

MacConnection carries the entire PTS collection. A partial listing follows.

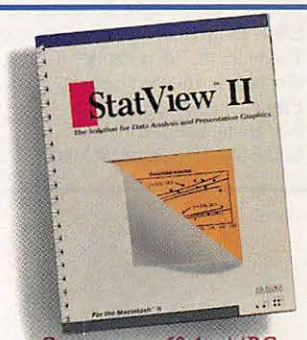
4946 Excellerate *(beginner level)* 29.
4852 PageTutor *(beginner level)*. 39.
4947 LearnWord *(beginner level)*. 39.

★Simon & Schuster ... 60 day MBG

3305 Typing Tutor IV 1.2 35.

★Spinnaker ... 30 day MBG

2329 SAT Score Improvement 1.0 *(CP)* . . 57.



Abacus Concepts ... 60 day MBG

StatView II 1.03–Award-winning statistical analysis program, now with presentation quality color graphics. The only statistics package to receive a "Five Mouse Rating" by MacUser! $339.

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And walk away.

Springboard
3531 Early Games *(CP)* $28.
4493 Atlas Explorer *(CP)* 28.

★Think Educational ... 60 day MBG
3615 MacEdge II 1.0 *(CP)* 27.
3616 Mind Over Mac 1.4 *(CP)* 27.

★Unicorn ... 30 day MBG
3751 Animal Kingdom *(CP)* 27.
3756 Math Wizard *(CP)* 27.

ENTERTAINMENT

Access Software
4655 World Class Leader Board Golf 28.

★Accolade ... 30 day MBG
1184 Hardball *(CP)* 23.
4484 Mean 18 *(CP)* 23.
4485 4th and Inches *(CP)* 23.

Activision
4475 Quarterstaff *(CP)* 30.
4486 Manhole 30.
4592 Zork Zero *(CP)* 36.

Broderbund Software
4099 Shufflepuck Cafe *(CP, air hockey)* . . 24.
4111 Moebius *(CP, adventure & arcade)* . 24.
4229 Where is Carmen Sandiego? *(CP)* . . 27.
4965 Auto Duel *(CP)* 27.
4966 SimCity *(CP)* 27.
1421 Ancient Art of War *(CP)* 27.
4540 Ancient Art of War at Sea *(CP)* 27.

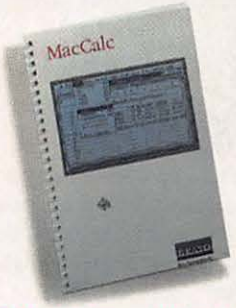
Bullseye
1544 Ferrari Grand Prix *(CP)* 32.
4074 P51 Mustang Flight Simulator *(CP)* . . 32.

★Casady & Greene ... 60 day MBG
2268 Crystal Quest 2.2C *(CP)* 26.
4119 Crystal Quest w/Critter Editor 2.2C . . 42.

★Discovery Software ... 30 day MBG
4408 Arkanoid 27.

Electronic Arts
1850 Reach for the Stars *(CP)* 26.
1842 Chessmaster 2000 *(CP)* 28.
4064 Chuck Yeager Flight Simulator *(CP)* . 32.
4588 Life & Death *(CP, surgery simulation)* . 32.
4945 The Hunt for Red October *(CP)* 32.
4981 Starfleet 1: The War Begins 36.

Epyx
2037 Sub Battle Simulator 29.
4660 Sub Battle Simulator for Mac II 29.



Bravo Technologies ... 30 day MBG
MacCalc 1.2D–Faster than any other spreadsheet! Features include: Pre-defined formula tables; cell-by-cell font, size & style control; and reads/writes WKS files. 1986 MacUser Eddy Award "Top Spreadsheet of the Year". . . . $77.

Infinity Software
2518 GO $27.
2519 Grand Slam Tennis 27.

Micro Sports
2787 MSFL Pro League Football 32.

MicroProse
4697 Pirates! *(CP)* 32.

★Microsoft ... 30 day MBG
2868 Flight Simulator *(CP)* 33.

Miles Computing
2767 Harrier Strike Mission II *(CP)* *special* 27.
2765 Fool's Errand *(CP)* *special* 27.

Mindscape
4083 Balance of Power 1990 *(CP)* 30.
3987 Colony *(CP)* 30.
4596 Deja Vu II *(CP)* 30.
2749 Shadowgate *(CP)* 30.

PBI Software
3110 Strategic Conquest Plus 2.0 *(CP)* . . . 35.
4985 NetTrek—The Real Version. 35.

PCAI
3144 MacGolf 2.0 *(CP)* 35.
4320 MacGolf Classic *(CP)* 54.
4321 Lunar Rescue *(CP)* 34.
4517 Road Racer *(CP)* 39.



Chang Labs ... 60 day MBG
Rags-to-Riches 3-Pak 3.1–Unparalleled value in Macintosh accounting. Includes Ledger, Receivables, & Payables. *Buy thru May 31, 1989 and receive Aatrix Payroll FREE! (a $99 value)* . . . $289.

Primera Software
3169 Smash Hit Racquetball II 21.

Sierra On-Line
3397 Leisure Suit Larry *(CP)* 23.
3396 King's Quest III *(CP)* 29.
3398 Police Quest *(CP)* 29.
3400 Space Quest II *(CP)* 29.

★Silicon Beach ... 60 day MBG
3501 Apache Strike 27.
3503 Dark Castle 27.
3502 Beyond Dark Castle. 27.
3508 World Builder. 41.

★Simon & Schuster ... 60 day MBG
3303 Star Trek Kobayashi Alternative *(CP)* 24.
3304 Star Trek Promethian Prophecy *(CP)* 15.

Sir-Tech
3347 Mac Wizardry *(CP)* 35.

★Softstream, Inc. ... 60 day MBG
4071 Mac•Man *(w/adapter)* 24.
4072 The Solitaire DA 24.
4073 Colour Billiards 35.
4078 Game Pak *(above 3 titles)* 75.
4995 Cribbage Tutor 27.



Chang Labs ... 60 day MBG
C.A.T. 2.0–A lightning-fast relational database for managing your contacts, tracking facts, figures, events, projects, writing letters, and performing mailmerges. $229.

★Spectrum Holobyte ... 30 day MBG
4175 Solitaire Royale *(for Mac SE)* 20.
3464 Tetris. 20.
4472 Tetris *(color version)* 24.
3460 GATO 26.
3462 PT-109 26.
3459 Falcon 2.0 32.

★Spinnaker ... 30 day MBG
2328 Sargon IV *(CP)* 29.

Springboard
4988 Hidden Agenda 36.

★SubLogic ... 60 day MBG
4698 Jet *(CP)* 32.

NETWORKS & COMMUNICATIONS

★Abaton ... 30 day MBG
4589 InterFAX Modem 325.

★CE Software ... 60 day MBG
3963 QuickMail 1.05 159.

★CompuServe ... 60 day MBG
1676 CompuServe Information Service . . 24.
1673 CompuServe Navigator 2.02 45.
1674 Standard Service/Navigator Bundle 59.

★DataViz ... 60 day MBG
1823 MacLink Plus 3.0 139.
4842 MacLink Plus/Translators. 119.

★Dove Computer ... 60 day MBG
4939 FastNet III 450.
4938 FastNet SE 450.
4937 FastNet SCSI 925.

★Dow Jones ... 30 day MBG
1789 Dow Jones Membership Kit 24.
1785 Desktop Express 1.03 95.
1786 Market Manager Plus 2.0 189.

★Farallon Computing ... 30 day MBG
4208 Timbuktu 2.0.1 65.
4866 Timbuktu Remote 195.
4867 Timbuktu 30-Pack. 1395.
2201 TrafficWatch 1.08. 139.
2202 PhoneNET-AppleTalk 120 adapter. . . 9.
2203 PhoneNET PLUS *(DIN-8)* 35.
2204 PhoneNET PLUS *(DB-9)* 35.
2205 PhoneNET Punch Down Block 69.
4869 PhoneNET Connector 10-Pack . . . 225.
4868 PhoneNET Repeater 325.
2206 PhoneNET StarController 1199.



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Dear MacConnection,

Three weeks of hopping on one foot with crutches. Three weeks of reading short stories. Three weeks of rearranging files on my hard drive.

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I decided on "Where in the World is Carmen Sandiego?" I wished I had it right then.

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Just for the record, all the ads in this series feature real live MacConnection customers and the real live letters they wrote us. Really!

where you see stars.

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3177 HD-WSI *(Apple HD-20 to SCSI)* . . $269.
3181 MacBottom HD 21 SCSI 659.
3185 MacBottom HD 32 SCSI 699.
3189 MacBottom HD 45 SCSI 859.
3190 MacBottom HD 70 SCSI 999.
4658 MacBottom HD 84 SCSI 1249.

DISKS

3297 **Sony** 3½" DS/DD Disks 18.
3772 **Verbatim** 3½" DS/DD Disks 19.
2214 **Fuji** 3½" DS/DD Disks 19.
2792 **MAXELL** 3½" DS/DD Disks 19.

3298 **Sony** 3½" HD Disks *(1.44 Meg)* . . . 47.
3773 **Verbatim** 3½" HD Disks *(1.44 Meg)* . 47.
2215 **Fuji** 3½" HD Disks *(1.44 Meg)* 49.
2793 **MAXELL** 3½" HD Disks *(1.44 Meg)* 49.

ACCESSORIES

★Avery ... 60 day MBG

4864 3½" Disk Labels *(Qty. 250)* 13.
4865 3½" x 15/16" Address Labels *(Qty. 3750)* 15.
4811 8½" x 11" Transparencies *(Qty. 50)* 22.

Bantam Publishing

1403 Complete HyperCard Handbook . . 23.

★Computer Coverup ... 60 day MBG

1723 ImageWriter II Cover 8.
1722 ImageWriter LQ Cover 8.
1725 Mac SE Ext. Keyboard Cover Set . . 10.
4657 LaserWriter II Cover. 10.

★Ergotron ... 60 day MBG

2004 Mouse Cleaner 360° 15.
3992 The Muzzle *(covers power outlet)* . . 62.
2000 MacTilt SE 68.

★Goldstein & Blair ... 30 day MBG

2267 *The Macintosh Bible* (2nd Edition). . 20.

★I/O Design ... 30 day MBG

2378 MacLuggage HDware 49.
2379 MacLuggage Imageware II. 49.
2376 MacLuggage Macinware Plus 64.
2381 MacLuggage Macinware SE. 75.

Kalmar Designs

2531 Teakwood Roll-top Case *(holds 45 disks)* 14.
2532 Teakwood Roll-top Case *(holds 90 disks)* 21.
2533 Teakwood Roll-top Case *(holds 135 disks)* 31.



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MacLuggage Macinware SE–Features a tear, soil and water resistant Cordura outer shell, and ultra-high density foam. Compartments for your mouse, cords, extended keyboard and drive. $75.

★Kensington ... 30 day MBG

MacConnection carries the entire line of Kensington's accessories. Partial listing below.

2577 Mouseway *(mouse pad)* $8.
4126 LaserWriter II Cover. 17.
2589 Universal Printer Stand 15.
4997 Space Saving Printer Stand. 17.
2545 Universal Copy Stand 22.
4970 Modem/FAX Protector 10 15.
4971 Modem/FAX Protector 20 25.
4972 Power Tree 10 *(good)* 19.
4973 Power Tree 20 *(better)* 29.
4974 Power Tree 50 *(best)* 59.
2556 Maccessories Anti-Glare Filter. 33.
2559 Apple Security System 34.
2568 Maccessories SuperBase. 34.
2585 Printer Muffler 80 43.
2586 Printer Muffler 80 Stand 24.
2583 Printer Muffler 132 58.
2584 Printer Muffler 132 Stand 24.
4070 System Saver SE. 52.



PCPC ... 30 day MBG

MacBottom–Rated 4½ Mice in April '89 MacUser. These high performance hard drives are formatted & ready to plug in. Includes spooler, back-up, & other utilities. See line listing for prices.

2566 System Saver Mac *(platinum)* 64.
2546 Maccessories A-B Box 64.
4941 Mac II Monitor Stand. 65.
4643 Mac II Stand and Cable Kit 65.
2561 MasterPiece Mac II 105.
Large Screen Anti-Glare Filters call

★MacConnection ... 60 day MBG

4623 Solid Oak Disk Case, made by New England craftsman *(holds 90 disks)* . . . 29.

★Mobius Technologies ... 60 day MBG

4470 Fanny Mac QT 60.

★Moustrak ... 60 day MBG

2694 Moustrak Pad *(standard 7"x9")* 8.
2692 Moustrak Pad *(large 9"x11")* 9.
2693 Moustrak Pad L/F *(9"x11")* 10.
Moustrak Designer Series ea. 12.

Ribbons

3255 ImageWriter II Ribbon. 4.
3261 ImageWriter II 4-color Ribbon 9.
3270 ImageWriter II Rainbow Six Pack. . . 20.
3260 ImageWriter LQ Black Ribbon. 17.

★Simon & Schuster ... 60 day MBG

4230 *The Fully Powered Mac* book 24.

★Sopris Softworks ... 60 day MBG

4016 MacPlus Cover *(navy)* 15.



Practical Peripherals ... 30 day MBG

Mac Communications Pack–Includes external 2400SA Modem, cable, and top-selling communication software. Hayes compatible, auto-answer. A superior value! $225.

4171 Mac SE Std. Keyboard Cover *(navy)* . . 15.
4019 Mac SE & Ext. Keyboard Cover *(navy)* . 15.
4017 ImageWriter II Cover *(navy)* 11.
4168 ImageWriter LQ Cover *(navy)* 13.
4018 LaserWriter II Cover *(navy)*. 17.
4012 High Trek ImageWriter II carry case. 49.
4013 High Trek Mac Plus carry case 59.
4014 High Trek Mac SE & ext. kybd. case 69.

★Targus ... 60 day MBG

3618 ImageWriter II Carry Case. 49.
3617 Mac Plus/SE Carry Case. 59.
4015 Mac SE & Ext. Kybd. Carry Case . . 75.

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- All U.S. shipments insured; no additional charge.
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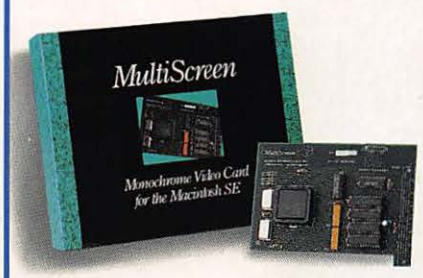
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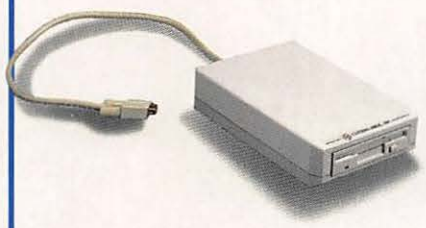
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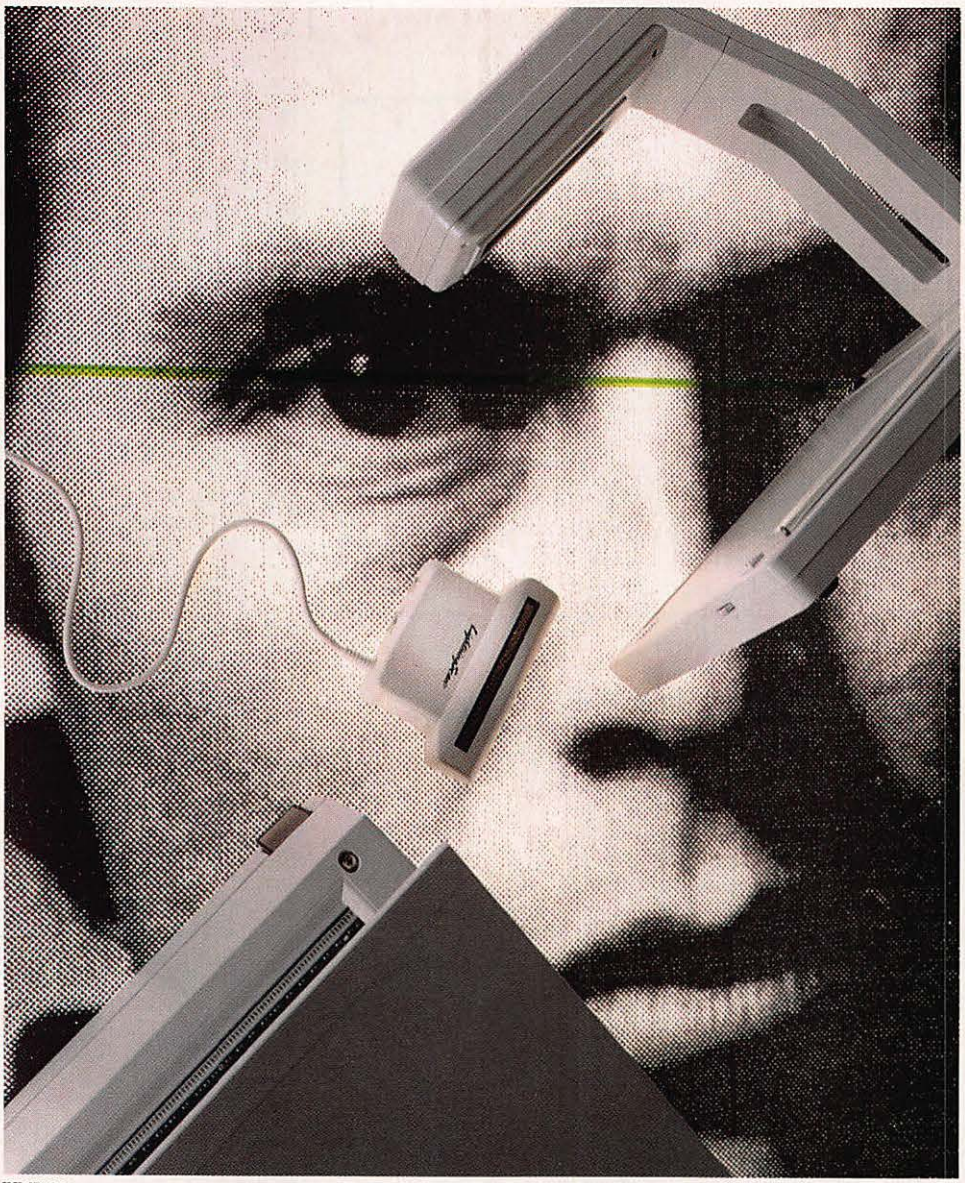
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1793 MaraThon 020 MSE1 585.
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SHOPPING *for* SCANNERS



FRED STIMSON

It takes the right combination of hardware and software to get the quality and control you need

by Steve Roth

How would you get by without photocopiers? Can you imagine not being able to make copies of anything, except with a camera? Scanners are fast becoming the computer equivalent of photocopiers, and once you start using them, they become just as essential as those old xerographic devices. All of a sudden the images lying around your office are yours to control. You can pull them into your little silicon world and have your way with them.

But first you need a scanner, and deciding which one you need isn't easy. When you're shopping for a scanner, as with anything else, you have to ask yourself what you want to do with it. If you just want to capture some images to place in a HyperCard stack, you won't need as much scanner as if you want to produce magazine-quality halftones.

There are basically six scenarios in which you might want to use a scanner (for today, we'll exclude color scanning):

- *to capture images for use as drawing templates in programs like Illustrator and FreeHand*
- *to capture low-resolution images for screen display or FPO (for position only) placement in publications*
- *to capture line art for publication*
- *to capture photographs for publication as halftones*
- *to capture text for use with optical character recognition (OCR) programs*
- *to capture images of three-dimensional objects for publication as halftones*

This article focuses on scanners for the first four scenarios—the world of flat art (for the lowdown on OCR, see "The Reading Edge" in the February 1989 *Macworld*). For three-dimensional images you'll want to look at video digitizers; they let you put a mountain in your computer, but they don't do a very good job with flat art.

Once you know what you want to accomplish with a scanner, you can set about finding a unit with the features you need for that job.

SCANNER HARDWARE

The first question you should address is the appropriate format for your type of work. There are sheetfed units that draw the paper through the machine; flatbeds that let you place objects on the glass *platen*, as you do with a photocopier; *overhead* scanners that look like overhead projectors and capture images from above; and hand-held scanners that you roll over an image. Each has advantages and drawbacks.

- *Sheetfed scanners* are inexpensive and fast (fast compared to hand-helds and overheads, at least). The sheetfed version of New Image Technology's MacScan, for instance, costs only $999, and it delivers speedy 300-dpi scans that are quite acceptable for many needs.

There are basically six scenarios in which you might want to use a scanner

The disadvantages of sheetfed scanners lie in the limitations they place on what you can scan, their tendency to mar the original document, and problems with alignment.

Sheetfeds can scan only single sheets of paper, so they can't do books or three-dimensional objects. If you want to scan only photographs, this might be OK, except that sheetfed scanners have a tendency to put rubber marks on the surface of, fold the edges of, or otherwise disfigure the print. This is a problem particularly when you have to scan several times.

The alignment problems come in when you scan line art. If you scan in a drawing and the roller mechanisms skew it slightly, straight lines come out slightly jagged. This effect is almost impossible to correct using a paint program.

So what is the bottom line? Sheetfeds are good for FPO images or for low-resolution bitmaps for screen display. They're are also fine for use in OCR, especially in units like the Datacopy JetReader, which has a built-in automatic document feeder (ADF).

- *Flatbed scanners* are the best bet for scanning flat art. They give more flexibility than anything else, but they're expensive, starting at around $2000 and ranging up to many thousands of dollars. For the price, flatbed scanners enable you to align images accurately, capture images from books and magazines, and even scan small, three-dimensional objects (like your hand). ADFs are often available for OCR work.

- *Overhead scanners* let you scan books and align documents precisely, but (unless the unit comes with a special holder) it's hard to get a book or magazine to lie flat on the copy stand. Because of this, the prime use for these machines is single sheets and some three-dimensional objects (they can also be used to place 3-D objects into photographs, by scanning the two together). Overhead scanners are generally slower than sheetfeds and flatbeds.

The lower-priced overheads, such as Mirror Technologies' $595 VisionScan, are dependent on room light for making exposures, so quality can vary widely. Truvel's much more expensive offerings include lighting units that ensure correct exposure. The Truvel units provide good quality, but it's doubtful whether most people will find the ability to scan small 3-D objects as well as flat art worth these machines' premium prices (see "Scanning the Scanners"). Since you can't attach an ADF, overheads aren't recommended for OCR work.

- *Hand-held scanners* let you capture small images—generally 5 inches wide or less—at resolutions up to 400 dpi. The main advantage of a hand-held scanner is price (LightningScan from Thunderware and Logitech's ScanMan—both use the same scanning unit—sell for around $500). Their biggest problem is alignment; you need to slide the unit along a straight edge to capture line art properly. Hand-held scanners are easy and convenient, especially for capturing small line-art images as drawing templates. They're useful for bringing line art into publications, and for creating lower-quality halftones of small images. Hand-held scanners are perfect for FPO and screen display images. Since you can scan several pieces and put them together in a paint program, you aren't really limited to the 5-inch width, but if you are doing many large scans, the extra step quickly becomes annoying. It's difficult or impossible to assemble multiple halftone captures seamlessly.

Bi-level scanners have had the advantage of low price, but these days you can get gray scale for the same money.

- *ThunderScan*, from Thunderware, is in a class by itself. You plug this $249 scanner into the position usually occupied by the ribbon cartridge on an ImageWriter printer, which means you use your printer to capture an image from the page, rather than to put one there. If you have an ImageWriter, ThunderScan is an attractive and inexpensive option. If you don't own an ImageWriter, it's not worth buying one to use ThunderScan.

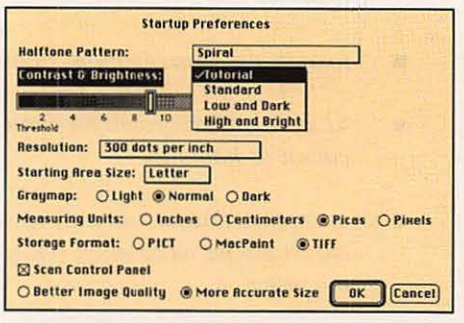
ThunderScan can provide very good quality, and the software is impressive. The unit is finicky, however, and its slow input speed is a major drawback. At low resolutions the speed is acceptable, but for high-quality line art or halftones, scans can tie up the Mac for half an hour or an hour. And you generally need to scan more than once to get it right. Don't even think about ThunderScan for OCR.

FLAT OR DEEP?

Once you've decided what physical type of scanner you need, you have to think about whether or not you want one that captures gray scales. The first generation of Mac scanners captured only bi-level, or *flat*, bitmaps, in which each sample point is either black or white (as in a MacPaint image). Traditionally, bi-level scanners have the advantage of low price, but these days you can get gray-scale scanners for virtually the same money.

Gray-scale scanners capture more information for each sample point. Some capture 4 bits per sample point, which means they can produce images with 16 gray levels (2^4). The Datacopy 730GS, at $2000, captures 6 bits, for 64 gray levels (2^6). Others, such as the Datacopy 840 ($7500) and the Microtek 400 ($4000), go as high as 8 bits (256 levels of gray).

Bi-level scanners do the job for FPO images, drawing templates, and OCR work. They're perfect for line art. Not to say that you can't capture photographs with bi-level scanners; but if you do, all the halftoning is done at scan time, resulting in a dithered, bi-level image (see "Who Does the Halftone?"). If the printer resolution is different from the original scan resolution when you print a dithered halftone, or if you size the image in your page-makeup program, the dither pattern turns into an ugly mishmash. Dithered bitmaps are almost impossible to edit in a paint program, you can't adjust their contrast or brightness once scanning is complete, and you can't take advantage of high-resolution output devices.



Preferences and Presets
AppleScan manages to fit the most commonly used features of scanning software into a sleek, intuitive interface.

SCANNING THE SCANNERS

	Scanner	Price	Type [1]	Max. Optical Resolution (dpi)	Gray Levels/ Bits per Sample	Dither Patterns	Bundled Software	Maximum Image Size (in inches)	ADF Avail.
Abaton	300 S	$1795	FB	300	16/4	2	PanelScan, Digital Darkroom	8 ½ x 14	no
Apple	Apple Scanner	$1799	FB	300	16/4	4 [2]	AppleScan,	8 ½ x 14	no
						30 [3]	HyperScan		
Datacopy	Datacopy JetReader	$1995	SF	300	2/1	2	MacImage	8 ½ x 14	yes [4]
	Datacopy 730	$2495	FB	300	16/4	2	MacImage	8 ½ x 12 [5]	yes
	Datacopy 730GS	$1995	FB	300	64/6	7	MacImage	8 ½ x 12	no
	Datacopy 830	$3495	FB	300	64/6	5	MacImage	8 ½ x 12 [5]	yes
	Datacopy 840	$7495	FB	400	256/8	0	MacImage	8 ½ x 12 [5]	yes
Dest	PC Scan 1000	$1795	FB	300	16/4	4	PublishPac, SuperPaint	8 ½ x 11 [5]	yes
	PC Scan 1020	$2695	FB	300	16/4	4	PublishPac, SuperPaint	8 ½ x 11 [5]	yes
	PC Scan 2000	$1495	SF	300	256/8	4	PublishPac, SuperPaint	8 ½ x 14	yes
	PC Scan 2020	$2495	SF	300	256/8	4	PublishPac, SuperPaint	8 ½ x 14	yes
Hewlett-Packard	ScanJet	$2090	FB	300	16/4	4	Desk Gallery	8 ½ x 11 [5]	yes
	ScanJet Plus	$2190	FB	300	256/8	6	Desk Gallery Plus	8 ½ x 11	yes
Logitech	ScanMan	$499	HH	400	2/1	3	ScanMan DA	4 wide	no
Microtek Lab	MSF 300C	$1595/$1795 [6]	FB	300	2/1	8	SuperPaint 2.0, VersaScan	8 ½ x 14	yes
	MSF 300A	$1895/$2095 [6]	FB	300	2/1	12	SuperPaint 2.0, VersaScan	8 ½ x 14	yes
	MS 300A	$1895/$2095 [6]	SF	300	2/1	12	SuperPaint 2.0, VersaScan	8 ½ x 14	yes
	MSF 300Q, QS [7]	$2495	FB	300	64/6	12	SuperPaint 2.0, Digital	8 ½ x 14	yes
							Darkroom, GrayScan		
	MSF 300G, GS [8]	$3995	FB	300	256/8	12	SuperPaint 2.0, Digital	8 ½ x 14	yes
							Darkroom, GrayScan		
	MSF 400G, GS [8]	$3995	FB	400	256/8	12	SuperPaint 2.0, Digital	8 ½ x 14	yes
							Darkroom, GrayScan		
Mirror Technologies	VisionScan 200	$597	OH	200	2/1	1	VisionScan, DeskPaint	8 ½ x 11	no
	VisionScan 300	$797	OH	300	2/1	1	VisionScan, DeskPaint	8 ½ x 11	no
New Image	MacScan	$999/$1995 [9]	SF/FB	300	2/1	2	MacScan	8 ½ x 11 [10]	no
Technology	MacScan Pro	$1599/$2895 [11]	SF/FB	300	256/8	2	MacScan	8 ½ x 11 [10]	no
Siemens Information	HighScan 400	$4900	FB	400	256/8	6	HighScan	8 ½ x 12	yes
Systems [12]	HighScan 600	$5800	FB	600	256/8	6	HighScan	8 ½ x 12	yes
	HighScan 800	$6800	FB	800	256/8	6	HighScan	8 ½ x 12	yes
Thunderware	LightningScan	$549	HH	400	2/1	3	ThunderScan	4 wide	no
	ThunderScan	$249	PH	288	32/5	1	ThunderScan	11x14	n/a
Truvel	TZ 3	$5995	OH	900	256/8	1	TruScan	11x17	no
	TZ 3T	$8495	OH	900	256/8	1	TruScan	11x17	no
	(transparencies)								
	TZ 3X (x-rays)	$12,495	SF	700	256/8	1	TruScan	14 wide	no
	TF 3X (x-rays)	$11,495	SF	256	256/8	1	TruScan	14 wide	no

[1] SF = Sheetfed, FB = Flatbed, PH = Printhead, HH = Hand-held, OH = Overhead.

[2] AppleScan.

[3] HyperScan.

[4] Built-in.

[5] 8½ x14 with ADF.

[6] Second price includes SCSI interface.

[7] GS has built-in SCSI interface; Q has separate SCSI interface.

[8] GS has built-in SCSI interface; G has separate SCSI interface.

[9] Software and interface only, $648.

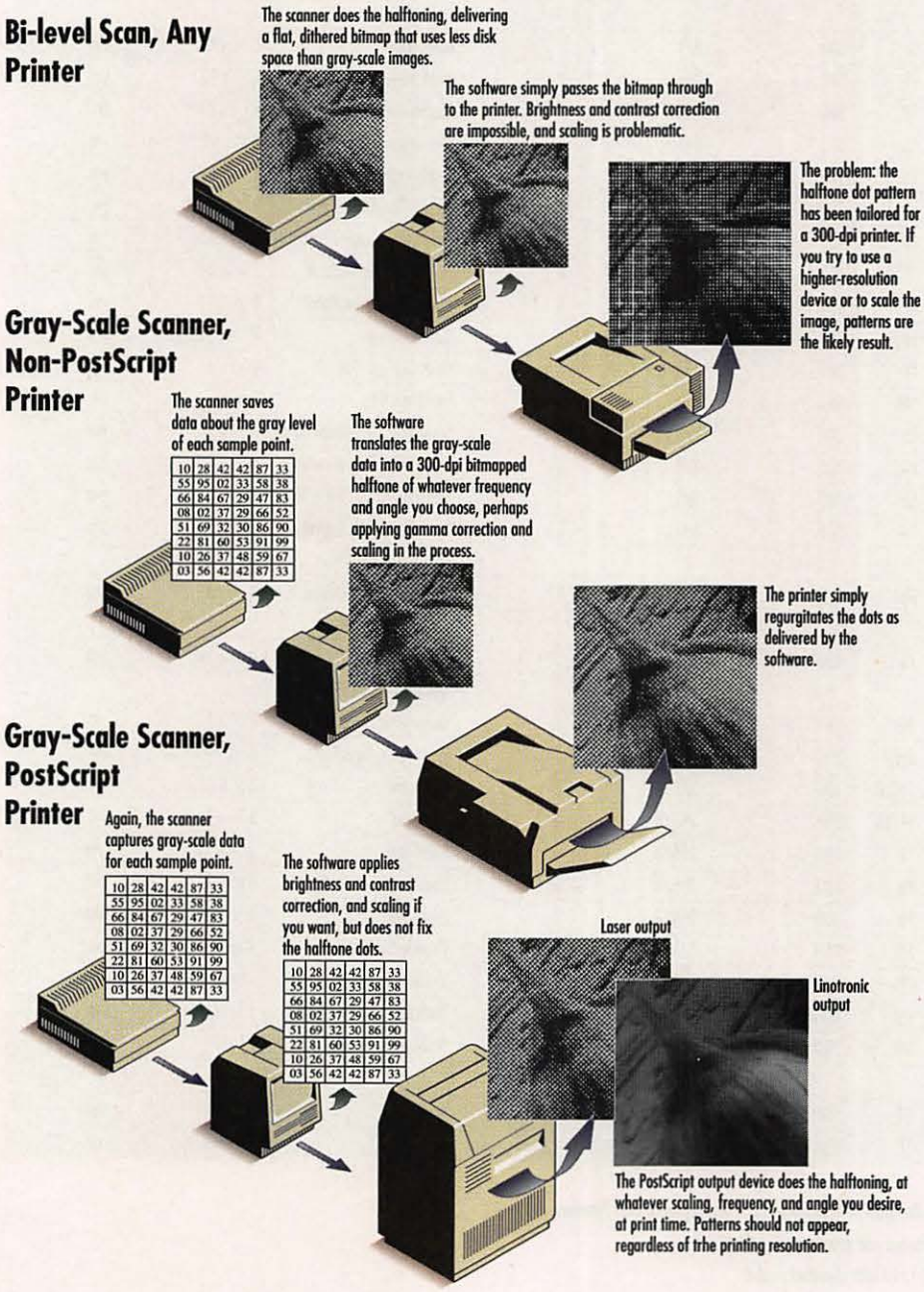
[10] 8 ½ x14 with sheetfed model.

[11] Software and interface only, $1295.

[12] Prerelease; information on this product may change.

With gray-scale images, the halftoning happens only on printout, so you can scale the image with impunity, adjust contrast and brightness after scanning (if your software allows it), and take advantage of high-resolution output devices such as phototypesetters. For most publication-quality halftone work, get a gray-scale scanner. Four bits is fine for laser output, but to get the best off the Linotronic, use an 8-bit scanner.

The downside of gray-scale images is unwieldy file size. An 8-by-10-inch image at 300 dpi with 8 bits per sample, saved uncompressed, eats 8 megabytes of disk and takes forever to scan, display, and print.



Who Does the Halftone?

One big question when you're creating halftones with the Mac: When does the halftoning actually take place? Does it happen in the scanner, the software, or the printer? The hardware and software determine when you do the halftoning, and how much flexibility you have with scanned images.

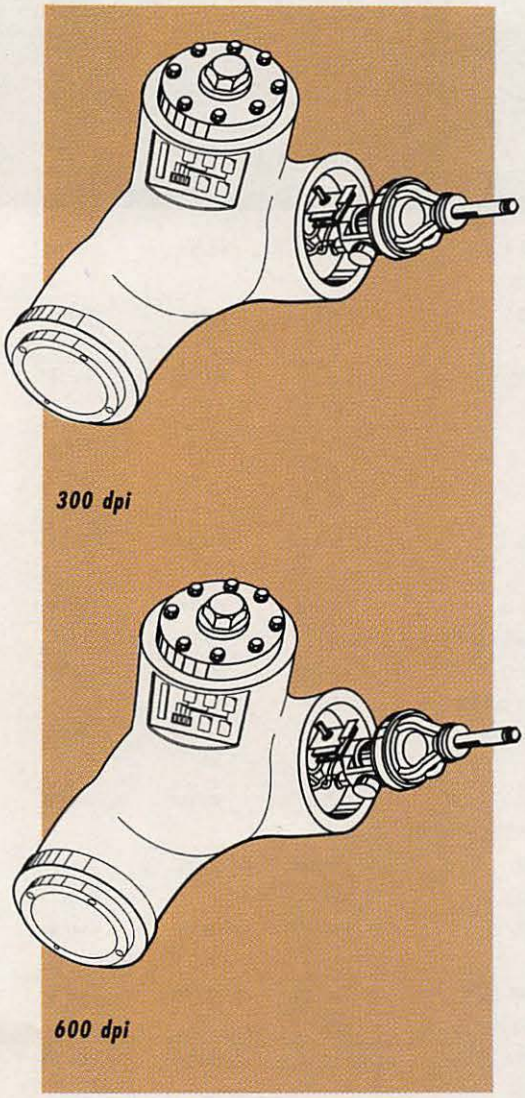
RESOLUTION

The next question to consider is how many dots per inch you need to capture. Most of the sheetfed and flatbed scanners weigh in at 300 dpi. A couple of the flatbeds (the Microtek MSF-400G and the Datacopy 840) go to 400 dpi. The handheld scanners coming on the market go as high as 400 dpi. ThunderScan hits 288 dpi if you have the time, and some of Truvel's overheads hit 900 dpi if you have the disk space.

The Hewlett-Packard ScanJet and a couple of other scanners use software algorithms to interpolate between scanner dots and go beyond their true optical resolution. Interpolation is useful if you need a specific scanning resolution to avoid patterns when printing dithered halftones, or when you want to make a gray-scale halftone of a small photographic image and print it at a larger size. Interpolation doesn't enable you to pick up finer detail, however.

If you are capturing images for FPO placement, screen display, or templates for drawing, resolution is not so important. For FPO and screen display work, 72 (or 75) dpi will be fine; 150 dpi usually suffices for drawing templates. High resolution *is* important for publishing line art without jaggies, and for halftones that provide both high screen-frequency and a good number of gray levels.

How high is high enough? If you typically print halftone images that are the same size as the original or smaller, you won't need more than 300 dpi—even if you produce a high-quality publication. At 300 dpi you can print 150-line halftones and still *oversample* by a factor of two. (Oversampling up to two-to-one yields sharper images; see "A Halftone Handbook," in the October 1988 *Macworld*). For line art also, 300 dpi should be sufficient. If the curved and diagonal lines are too jaggy for you, don't bother going to a 400-dpi or higher scanner, because the difference won't be that significant, and the files are immense (see "So Fine?"). For either line art or halftones, the only reason for going to higher-resolution (over 300 dpi) scanners is if you are going to be scaling images up.



So Fine?
The same image scanned on a Dest machine at 300 and 600 samples per inch. As you can see, the difference in quality is barely noticeable.

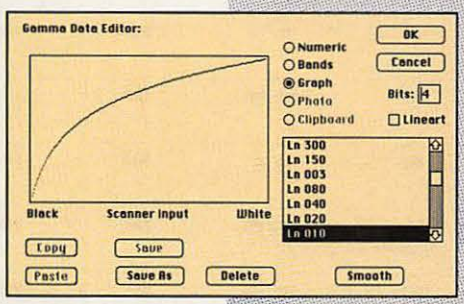
SCANNER SOFTWARE

So far we've talked mainly about the capabilities of scanning hardware. But the power and convenience of your scanning system depends on both hardware and software. Datacopy's MacImage software, for instance, is incredibly flexible, but when used with the company's 840 scanner the program forces you to scan at 256 gray levels and 400 dpi—major overkill for many jobs. Some systems have the opposite problem—they don't let you tap all the features of the scanner hardware. You might have access only to light, normal, and dark brightness controls, for instance, instead of a full range.

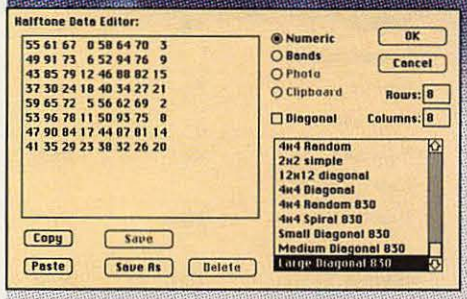
Scanning software can be divided into two classes: image capture and image modification. Some scanner software (such as Datacopy's MacImage) gives you control over both, enabling you to adjust the scanning parameters, scan the image, and then modify the captured image. Other programs force you to move to a separate program (SuperPaint, ImageStudio, Digital Darkroom, QuarkXpress, or PageMaker, for instance) to modify a captured image. Some of the companies with the latter type of scanning software supply you with an editing program (Abaton and Microtek, for example, are bundling special versions of Digital Darkroom with their scanners). Other companies expect you to buy your own editor.

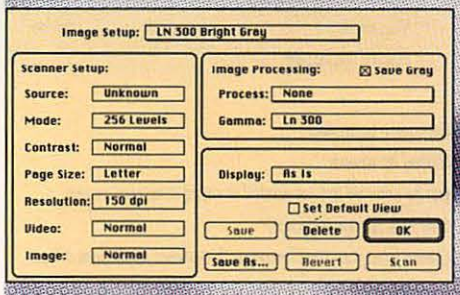
SCANNING CONTROL

While the wondrous software now available for editing and manipulating scans is all very well and good, for the best-quality images—especially with gray-scale images—you want to create a scan that looks right from the start. To achieve this, you'll need software with flexible scanning controls. When you evaluate scanners, be sure to look for the following controls among the software features.



▪ *Resolution* While the scanning hardware determines the maximum optical resolution of your scans, you don't always need maximum resolution. The software should let you choose other resolutions, to keep file sizes down and to fine-tune scans for special situations. Some programs provide only three or four common resolution settings. Others go somewhat further: the software that comes with Microtek's 300-dpi scanners, for example, lets you select settings in 15-dpi increments. The ideal are scanners—such as the HP ScanJet—that let you adjust reso-





As You Like It
MacImage, Datacopy's scanning and image-modification software, offers dauntingly complete features, including explicit control over contrast, brightness, gamma curves, and even the halftone cell shape.

SCANNER SOFTWARE

	GENERAL FEATURES						PRESCAN CONTROLS		
	App., DA, CDEV	Show Space Req./Avail.	Disk or RAM Limited	Scan Area/ Preview Scan	Scaling	Avail. Resolution/ Increments (dpi)	Bits per Sample	Brightness/ Contrast	Gamma/ Threshold
AppleScan (Apple Scanner)	app.	yes/yes	disk	yes/yes	yes	75, 100, 150, 200, 300	1 or 4	yes/yes	no/yes
Desk Gallery (HP ScanJet)	app., DA	no/no	RAM	yes/yes	yes	38–600/1	1 or 4	yes/no	no/no
Desk Gallery Plus (HP ScanJet Plus)	app., DA	yes/no	disk	yes/yes	yes	12–1500/1	1, 4, 8	yes/yes	no/no
Digital Darkroom (Mikrotek and Abaton gray scanners)	app.	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
EditScan (Abaton scanners)	app.	no/no	disk	yes/yes	yes	25–300/25	1 or 4	yes/yes	no/yes
GrayScan (Mikrotek gray scanners)	app.	yes/yes	disk	yes/yes	yes	75–300 or 100–400/3 or 4 [1]	1 or max. only [1]	yes/yes	no/no
HighScan (Siemens Highscan)	app.	yes/no	disk	yes/yes	yes	10–400/1 also 600 and 800	1 or max. only	no/no	no/yes
HyperScan (Apple Scanner)	app.	no/no	disk	yes/yes	yes	dependent on scaling	1	yes/yes	no/no
MacImage (Datacopy scanners)	app.	yes/no	disk	yes/yes	yes	75, 100, 120, 150, 180, 200, 240, 300, 400	1, 4, 6, or 8 [2]	yes/yes	yes/no
MacScan (New Image scanners)	app.	no/no	RAM	yes/no	no	75, 100, 200, 300	1 or max. only	yes/no	no/no
PanelScan (Abaton scanners)	CDEV	no/no	disk	yes/yes	yes	25–300/25	1 or 4	yes/yes	no/yes
PublishPac (Dest scanners)	app.	yes/no	disk	yes/yes	yes	200, 240, 300 [7] 72–300/1 [8]	1 or max. only	yes/yes	no/no
ScanMan (Logitech hand scanner)	DA	yes/yes	RAM	yes/no	no	100, 200, 300, 400	1	yes/yes	no/yes
TruScan (Truvel scanners)	app.	no/no	RAM	yes/yes	yes	75–256, 700, 900/1 [1]	1 or max. only	yes/yes	no/yes
ThunderScan (Thunderware scanners)	app., DA [10]	yes/yes	RAM	yes/no	yes	72–288/1 [11] or 100, 200, 300, 400 [12]	1 or 5	no/no	no/no
VersaScan (Microtek b&w scanners)	app.	yes/yes	disk	yes/yes	yes	100–400/20 or 75–300/15 [1]	1	yes/yes	no/no
VisionScan (Mirror VisionScan)	app., DA	no/no	RAM	yes [13]/no	no	100, 120, 150, 200	1	no/no	no/no

[1] Depending on scanner.
[2] Limited by scanner.
[3] Can be adjusted but not printed or saved in current version.
[4] Only with custom postscript.
[5] Cannot print gray-scale images with standard Apple print driver.
[6] No printing available.
[7] Line-art mode.
[8] Halftone mode.
[9] Through SuperPaint.
[10] Some features are missing in DA version.
[11] With ThunderScan; controlled through scaling.
[12] With LightningScan.
[13] Controlled with markers on scanner, or numerically.
[14] Through DeskPaint, bundled with VisionScan.

lution in 1-dpi increments. This is especially useful if you know your final size and output resolution, and you want to scan at an exact multiple of that.

▪ *Number of Gray Levels* If you have a multibit scanner, it's very useful to be able to scan with less bits per sample point than your machine's maximum—to save on disk space and printing time for images that don't require maximum quality. Unfortunately, only a few exceptions among

POSTSCAN CONTROLS					PRINTING CONTROLS	
Brightness/ Contrast	Gamma	Gray to Dither/ Dither to Gray	Paint Tools B&W/Gray	Display Gray	Angle/ Freq.	Scaling
yes/yes	no	yes/no	b&w	no	no/no	yes
no/no	no	no/no	b&w	no	no/no	yes
no/no	no	no/no	b&w	yes	no/no	yes
yes/yes	yes	yes/yes	b&w/gray	yes	yes/yes	yes
no/no	no	no/no	b&w	no	no/no	no
no/no	no	no/no	none	yes	yes/yes	yes
yes/yes	no	yes/no	none	yes	no/no	yes
no/no	no	no/no	b&w	no	n/a	yes
yes/yes	no	yes/yes	none	yes	yes/yes	yes
no/no[3]	no	no/no	b&w	yes	no[4]/no[4]	yes[5]
no/no	no	no/no	none	no	n/a[6]	n/a
no/no	no	no/no	none[9]	yes	no/no	yes
no/no	no	no/no	b&w	n/a	n/a	yes
no/no	no	no/no	none	yes	no/no	no
yes/yes	yes	yes/yes	b&w	no	yes/no[4]	yes
no/no	no	no/no	b&w	n/a	n/a	yes
no/no	no	no/no	none[14]	n/a	n/a	no

the current crop of hardware and software give you this control.

▪ *Scan Area* It's quite common to want to scan only a portion of an image, to save on disk space and printing time. Most scanner software lets you do a quick preview scan, then draw a box around the area you want to capture. This is the most natural way to work. Some programs don't have the preview feature, and some even require you to key in the coordinates of the scanning area. Avoid such software.

▪ *Disk Space and Memory* In some cases, scanning software tells you how much space is required for an image before you scan, and whether or not you have enough space to complete the scan succesfully. Some software can't capture an image that's bigger than available RAM memory, while other programs use available disk space to capture large images. Needless to say, for high-resolution scans, especially with gray scales, software that uses the disk is preferable.

▪ *Scaling* If you're scanning line art or dithered halftones and know in advance how big the final image will be, it's useful to scale the image during scanning. This prevents the disturbing patterns that result when you scale dithered halftones, and avoids the clogging between thin lines that results when you reduce line art.

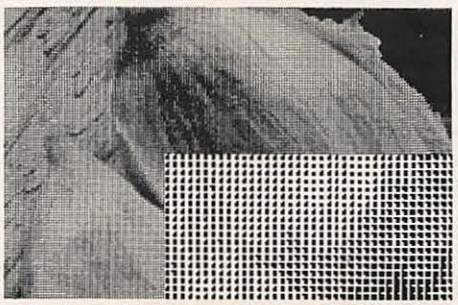
▪ *Brightness, Contrast, Threshold* It's important to adjust brightness and contrast before (rather than after) scanning, no matter what type of images you're capturing. With dithered halftones, you simply can't change these parameters once the dither pattern has been laid down. With gray-scale images, it's best to get brightness and contrast as close to what you want as possible at scan time, because whenever you use image-editing software to change the gray-map curve, you throw away information. This may be information you can't spare, particularly if you have only a 4- or 6-bit scanner.

With line art, the operative concept with respect to brightness and contrast is *threshold.* When you set the threshold, you select the point at which the light grays in an image will go to white, and the dark grays will go black. Even if the image you're scanning is just black and white to begin with, adjusting the threshold lets you screen out noise caused by such things as paper texture and color. AppleScan, MacImage, and some other programs let you explicitly control the threshold point for line-art scans, rather than using contrast and brightness settings. This method is much easier to understand and use than having to work through brightness and contrast controls.

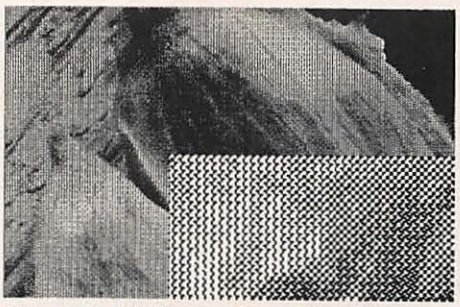
A sophisticated method for adjusting contrast and brightness is called gamma correction. Again, MacImage stands out here as the best of the lot. Rather than just adjusting contrast and brightness sliders, you can edit the contrast/brightness curve before scanning (see "Gamma Correction in Action"). Other programs offer the same control, but only over previously captured images.

▪ *Dither Pattern* For capturing dithered halftones, most scanners offer more than one dither pattern. Being able to

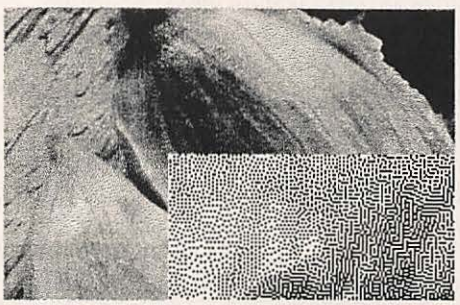
control the dither pattern isn't a must; these patterns sometimes help to bring out details in an image, but mostly the changes they make are a matter of aesthetics or special effects (see "In a Dither"). Apple's HyperScan offers 30 canned dither patterns, which can be useful to bring out an image given HyperCard's 72-dpi, bi-level limitation (see "HyperDither").



4-by-4-pixel halftone cells, spiral dither



4-by-4-pixel halftone cells, random dither



Error-diffusion dither pattern

In a Dither

Different dither patterns can bring out nuances in images and create a variety of special effects. Here you can see the same image printed at 300 dpi with three different dither patterns (all created with MacImage). The inset areas are enlarged to show the patterns. The first two emulate the appearance of traditional halftones, while the third creates a mezzotint effect.

After You Scan

Once you've captured an image, you generally want to view, edit, and modify it. You may want to use paint tools to cut, paste, and paint on the image, or you may want to adjust the overall image for brightness, contrast, or halftone effect. At the very least you will want to view the image on screen. If you are capturing gray-scale images and have a color or gray-scale monitor, you'll be able to see these files in their full, photographic-quality glory if you have a program that can display the gray levels on screen. Amazingly, some can't, and use a dither pattern on screen to represent the image.

- *Paint-Tools Image Editing* Some of the scanning programs (MacScan, EditScan, and VersaScan are examples) let you edit black-and-white images within the program, using a limited set of paint tools. This is handy, but a better approach is to use a full-featured paint or image-processing program like SuperPaint or DeskPaint (for bi-level images), or Image Studio or Digital Darkroom (for gray-scale images). Bear in mind that image editing is primarily useful for line art and gray-scale images. Editing 300-dpi dithered halftones with paint programs is pretty unworkable; about the only things you can really do are cut and paste and some rudimentary touch-up.

- *Brightness, Contrast, and Gamma Correction* While you'll want to be able to set brightness and contrast before scanning, being able to make changes to completed gray-scale scans is also important. ThunderScan, MacImage, Digital Darkroom, Image Studio, and some other programs let you modify gray-scale images after they've been captured. Some programs just give you a couple of buttons for light, dark, and normal; some give you sliders for contrast and brightness; and others give you explicit control over the gamma curve.

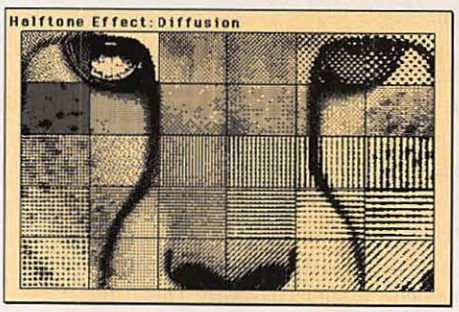
- *Gray Scale to Dither, and Dither to Gray Scale* Some packages (MacImage, LightningScan) let you take gray-scale images and convert them to dithered halftones, with varying degrees of control over the dither pattern. Others (LightningScan, ImageStudio, MacImage) take dithered halftones and deduce gray scales from them to produce lower-resolution images that include gray scales.

The ability to convert scans from gray scale to dither patterns is especially useful for screen display, and for any image where you want explicit control over special-effect halftoning. The dither-to-gray-scale conversion is less useful because the images that result usually retain some traces of the dither pattern, and the resulting halftones are not of publication quality.

- *Printing options* are important in scanning software, even though you may print your final copy from a page-makeup program. Before you decide to save your image, you may want to try out different printing options and see the results, then go back for another scan or further modifications if necessary. The printing controls in scanning software range from nonexistent (VisionScan, PanelScan), to rudimentary (MacScan), to quite robust (AppleScan, MacImage). With VisionScan, for instance, you need to save the image on disk, open it with DeskPaint (bundled with the scanner), and print it from there.

With MacScan you can print from within the program, but you have no control over scaling; output size is entirely dependent on image resolution and output-device resolution. If you print a 150-dpi scan on a 300-dpi printer, for instance, it comes out at half size, which is ridiculous. (MacScan's CopyScan option is useful, however; it scans and prints all at once, so you can try different parameters and see the results right away.)

AppleScan takes that CopyScan approach and makes it even more useful. You specify a test area on the image, and



HyperDither

HyperScan lets you choose from 30 dither patterns when you are scanning images.

AppleScan scans it several times with different parameters, and prints all the test scans on a single sheet (this only works with bi-level images, presumably on the assumption that you can correct gray-scale scans after they're captured).

If you are capturing images destined for publication, your scanning software should at least let you adjust the size of the printed image, and with gray-scale images, the screen frequency and angle. Printing options aren't so important if you're just capturing images for FPO screen display, or drawing templates.

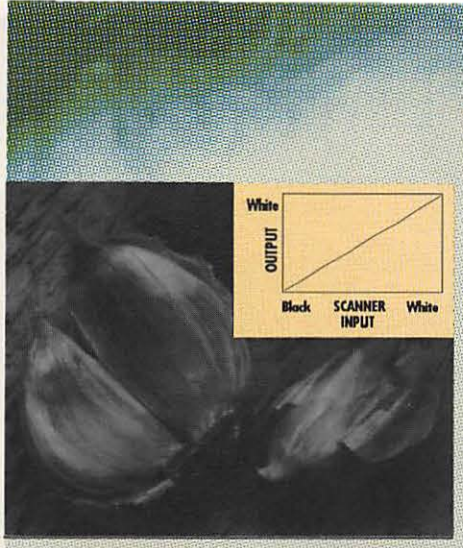
WHAT TO BUY

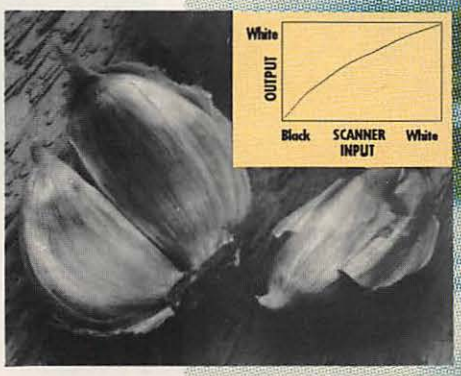
Now that you know more than you ever wanted to know about scanning hardware and software, you probably want to know which scanner you should buy. As usual, it depends—on your needs and your budget. Your budget is your business, but here's a roundup of the features you will want for the four scanning scenarios I listed at the beginning.

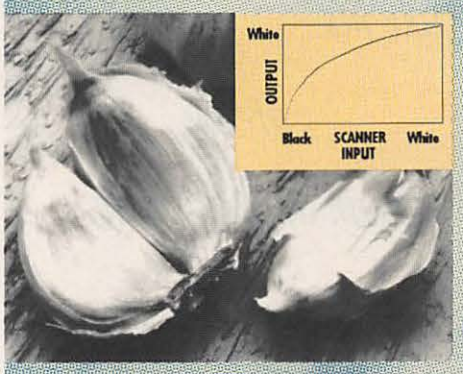
- *Drawing Templates* You don't need a top-notch scanner if you just want to capture images that you will then draw over in something like Illustrator or FreeHand. An inexpensive sheetfed, overhead, or hand-held scanner (for small images) will do. You don't generally need or want gray scales for drawing templates; while proper scan alignment can save you some time, it is not as critical for templates as it is with scans for line-art publication.
- *Publishing Line Art* You don't need the best scanner in the world for line-art publishing, either. What you do need is an overhead or flatbed that lets you align art precisely (though if you're on a limited budget and don't need to scan large images very often, a hand-held will suffice). In any case, resolution is important—go for 300 dpi. Explicit threshold control in the scanning software is useful, though brightness and contrast control over scanning can achieve much the same effect. You'll definitely want a good bitmap-editing program like DeskPaint, MacPaint, or SuperPaint 2.0.
- *Screen Display* Your needs here depend on the software and hardware you'll be using for display. If your setup can display gray levels (VideoWorks on a Mac II, for instance), it's to your advantage to use a gray-scale scanner. Gray-scale scanning is also useful with HyperScan, even though the latter displays only bi-level bitmaps, since you can adjust images for brightness, contrast, and dither pattern at scan time.

If you can't afford the flexibility of the AppleScan/HyperScan combo or another gray-scale scanner, just about any scanner will work for capturing screen images, since resolution doesn't have to be high. The main thing to look for in a bi-level scanner is a variety of dither patterns, or at least one dither pattern that you like. Alignment is not crucial.

- *FPO Placement* Get something cheap and fast. A sheetfed will do just fine; resolution is not important, and no gray scales are required. As long as the image is accurate enough that you can wrap type around it, and clear enough so your printer knows what goes where, you're in business. You'll want control over scan area and some simple editing tools to erase unwanted areas before you place the image.
- *Halftone Publication* This is the most demanding scanner application, and you'll need the best hardware and software you can buy. While the 4-bit flatbed scanners on the market can provide reasonable quality if you're not too demanding or are just using laser output, for really good images off the Linotronic you'll need an 8-bit scanner. You'll want control over brightness and contrast at scan time, the ability to alter the overall gamma curve (if you can get it), and tools for manipulating and editing the gray-scale image after it's been captured. Ⓜ







Gamma Correction in Action
The graphs inset in each of these gray-scale halftones come from Datacopy's MacImage and show the gamma-curve settings used to make each scan. The curve shows the relationship between input values and output. When the curve at the dark end of this flat, dark image is stretched, small differences in input brightness are made to yield increasingly larger changes in output brightness. The result: a more even distribution of tones and a better print.

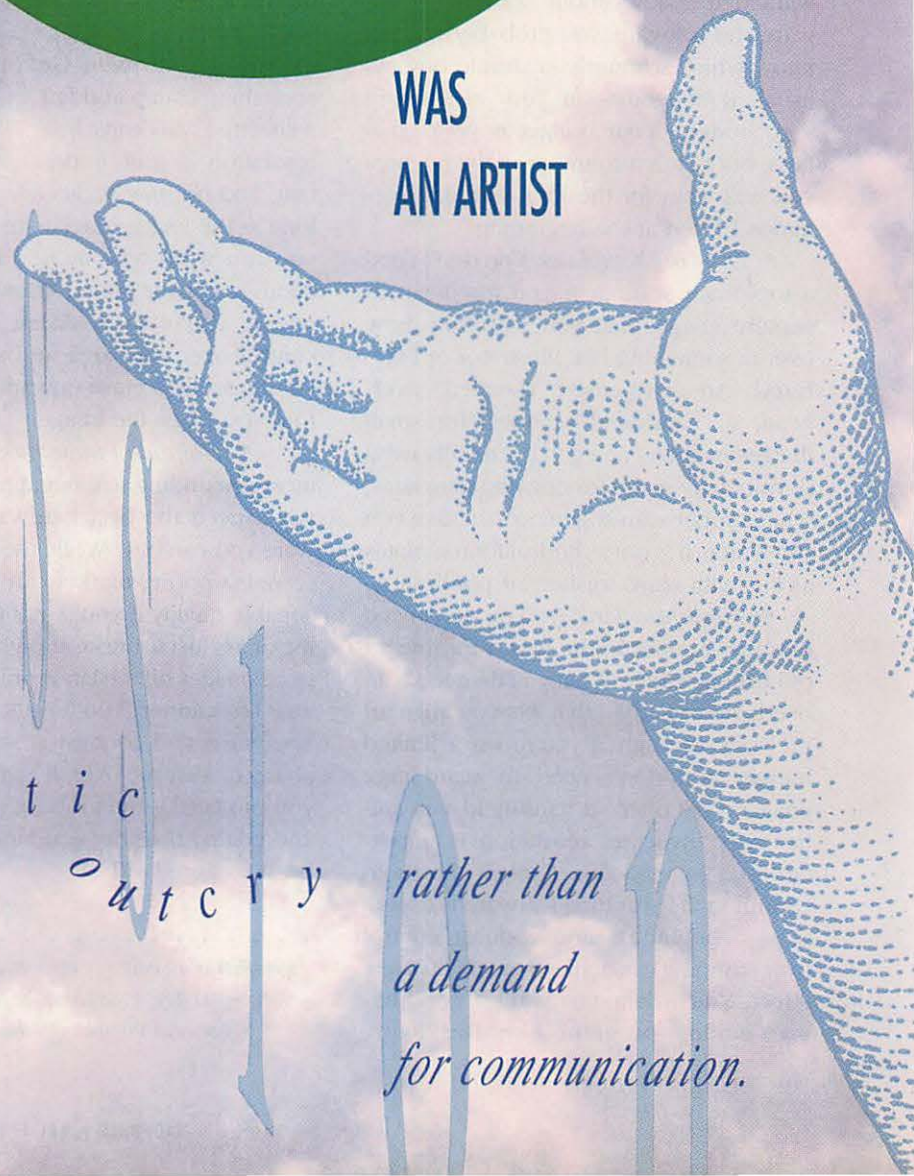
Steve Roth *is an editor of* Real World PostScript *(Addison-Wesley, 1988) and the former editor of* Personal Publishing *Magazine.*

UNDOUBTEDLY

THE FIRST MAN

WAS AN ARTIST

Man's **FIRST** *expression, like his* **FIRST** *dream, was an aesthetic one.*



Speech *was a poetic outcry rather than a demand for communication.*

ILLUSTRATION BY MICHELE WETHERBEE

Enhancing PostScript Fonts

BEND FONTS AND INFLUENCE PEOPLE, OR HOW TO ADD GRAPHIC TOUCHES TO TEXT

by Erfert Fenton

PostScript typefaces are experiencing a population explosion. Thanks to several companies' entering the Macintosh font market, and to the continued productivity of a half dozen established companies, I've got a font menu as long as my arm. But even with all those fonts up my sleeve, I still didn't have one that looked exactly right for the newsletter banner I'd recently promised to design in my alleged spare time. Fortunately, though, I'd just obtained several programs that allowed me to make the custom font I needed by altering one I had on hand. Thanks to these programs, you no longer have to be an artist or a type designer to add your own graphic touch to a type style. Now, even we typeface neophytes can have the satisfaction of doing it our way—even if we don't earn a place in the annals of great type design while we're at it.

A Sea of Faces

But before we delve into altering fonts, let's look at the raw material: the fonts themselves. More than 20 companies now market PostScript fonts, from classic text faces to wacky decorative ones. A year ago the majority of Mac type vendors offered mostly display, decorative, and novelty faces, leaving the lion's share of text faces to Adobe. But recently several of the big

Quoted from "The First Man Was an Artist," by Barnett Newman, anthologized in Theories of Modern Art (University of California Press, 1968)

COMMUNICATION

guys—including Bitstream, Compugraphic, Monotype, and Varityper—have entered the PostScript font game. And many smaller companies, including Alphabets and Neoscribe International, now offer excellent text faces as well. The Font Company, a newcomer located in Phoenix, recently announced plans to convert the entire URW (Unternehmensberatung Karow Rubow Weber GMBH) type library to PostScript format. And Image Club has announced plans to release fonts licensed from ITC (International TypeFace Corporation), Visual Graphics, and several other companies. There have also been changes in distribution: Dubl-Click now markets Software Complement and Neoscribe International; MacTography now distributes Century Software and Invincible Software.

The face looks familiar	Adobe's Helvetica
The face looks familiar	Compugraphic's Triumvirate
The face looks familiar	Adobe's Bodoni
The face looks familiar	Casady & Greene's Bodoni
The face looks familiar	Adobe's Goudy Old Style
The face looks familiar	Altsys's Goudy Oldstyle

Variations on a Face
Mac faces can differ greatly from one manufacturer to another, some companies give their own names to classic faces to avoid copyright infringement. Your best bet is to write to manufacturers for catalogs or purchase MacTography's PostScript Typeface Sampler.

Adobe still has some advantages, however. Adobe's faces are built into Apple's LaserWriter family and many other PostScript printers, giving them widespread distribution. And since Adobe's founders developed PostScript, the company's font designers have access to programming secrets that make characters look crisp at the LaserWriter's relatively low resolution of 300 dots per inch (dpi), especially at small point sizes.



Illustrator and FreeHand Effects
Illustrator 88 and FreeHand let you modify text. The marble M was created with Illustrator 88's Mask function; place the letter behind the pattern to be masked, then group the letter and the pattern before printing. With FreeHand you can attach text to a path to create effects like this logo.

But don't shy away from other font distributors for that reason. For one thing, you'd be shutting yourself off from an array of fonts not offered by Adobe. Also, many faces from other manufacturers look fine at 300 dpi, especially when printed at larger sizes. And 400-dpi and even 600-dpi laser printers are becoming more common, further eroding Adobe's low-res edge. Finally, many Macintosh publishers are shunning the LaserWriter's near-typeset quality (300 dpi) and going after real typeset quality, sending documents to a service bureau to be printed at 1200 dpi or 2400 dpi. At these resolutions, other companies' fonts look sharp and clear.

"PostScript Typeface Overview" shows PostScript type samples from 16 companies that offer text, display, and decorative typefaces. Some excellent faces have appeared in recent months, some from new companies, some from companies that have been around for a while but are now offering new fonts. Among my favorite newcomers are Adobe's Stone family (Stone Serif is shown in the table), the elegant Prospera from Alphabets, and a group of beautiful calligraphic faces from The Electric Typographer. In addition, the venerable Casady & Greene (formerly CasadyWare) continues to turn out high-quality decorative and display faces. If you're shopping for Mac typefaces, I'd highly recommend MacTography's $54 *PostScript Typeface Sampler*. This loose-leaf catalog shows complete character sets and sample paragraphs of most available Mac fonts, and it's updated periodically. Since more companies are offering text faces, MacTography's catalog will help you compare the appearance of faces offered by two or more manufacturers. "Variations on a Face" compares different renditions of some classic faces.

In addition to text, display, and decorative faces, many companies offer specialty fonts: foreign-language character sets, decorative borders, and pictorial fonts, to name a few. "Foreign Languages" and "Specialty Fonts" list specialized PostScript fonts and their distributors.

THE GRAPHICS CONNECTION

With all these PostScript typeface families to choose among, it seems almost inconceivable that you wouldn't find exactly what you need. Still, it happens. If it happens to you, PostScript graphics programs such as Adobe Illustrator 88, Aldus FreeHand, or Cricket Draw might be the answer.

Since these programs speak the same language as Macintosh fonts—PostScript—you can use them to alter the appearance of letters. For example, you can skew, rotate, stretch, or compress a word, and the reshaped letters will retain their crisp outlines when printed (unless you distort them beyond recognition, of course). In a PostScript graphics program, you are in effect placing a bounding rectangle around a word or letter. Pull on the upper-right handle of the bounding box and the word leans to the right; pull on the top edge of the box and the word stretches upward.

While they perform similar PostScript feats on fonts, each graphics program has its own text-handling specialties. FreeHand, for example, lets you attach text to a path. If you want logo or ad text to arch

Adobe	Futura ITC Garamond Lt. Stone Serif
Alphabets	Prospera
Altsys	Goudy Old Style PenStroke Venczia
Bitstream	ITC Galliard Baskerville News Gothic
Casady & Greene	Dorovar Jott Casual Meath
Compugraphic	Garth Graphic ITC Novarese Book Symphony
Dubl-Click Software	CutOuts Hobnob Nouveau
Electric Typographer	electric uncial Flourish Troubador
EmDash	ArchiText Briar Book Caspian Book
Image Club	NEON RockABilly THEATER
Linotype	Glypha Melior Trump Mediaeval
MacTography	Albany Dickens Murchison
Olduvai	BISCAYNE GROVE LARGO
Springboard Software	Circus Modern Old German
Studio 231	S Abbott Oldstyle S Albertus
T/Maker	Bombay Plymouth Seville

PostScript Typeface Overview

Not only are established companies like Adobe and Casady & Greene turning out new typefaces at a rapid rate, but several newcomers have added their wares to the PostScript type market. What you see here is a small representative sample of each company's typefaces. For serious comparison shopping, you should write for catalogs.



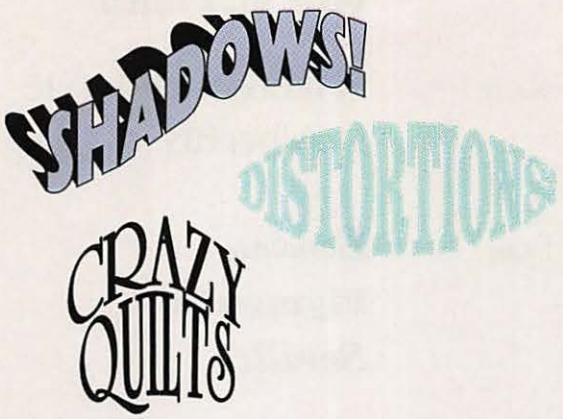
SENSITIVITY

Several PostScript type vendors offer either complete sets of foreign language faces or systems for transliteration.

FOREIGN LANGUAGES

FOREIGN LANGUAGE FONTS	
Arabic:	Eastern Language Systems
Cyrillic:	Casady & Greene
	Devonian International Software
	Ecological Linguistics
	Font World
	Linguists' Software
Greek	Allotype Typographics
	Ecological Linguistics
	Linguists' Software
	NeoScribe International
Hebrew:	Eastern Language Systems
	Font World
	Linguists' Software
	NeoScribe International
Hindi/Sanskrit:	NeoScribe International

ALPHABETS WITH DIACRITICAL MARKS FOR TRANSLITERATION	
Arabic:	Ecological Linguistics
Cyrillic:	Ecological Linguistics
European languages:	Ecological Linguistics
	Linguists' Software
Greek:	Ecological Linguistics
Hebrew:	Ecological Linguistics
Indian languages:	Ecological Linguistics
International Phonetic Association Alphabet:	Ecological Linguistics
	Linguists' Software
	NeoScribe International
Polish:	Allotype Typographics
Vietnamese:	Ecological Linguistics



New Faces
TypeStyler (top two) and LetraStudio let you distort and add dozens of special effects to type, and combine text with graphics.

over a graphic element, you can draw a curved line, attach the text to it, and then make the line invisible. FreeHand not only offers text on a path, but it has Illustrator 88 beat when it comes to editing text. In FreeHand, for instance, you can adjust kerning; type more than Illustrator's 255 characters in a block; and mix fonts, styles, and sizes in a single passage.

But Illustrator has its own pluses in the text department. For example, you can add a realistic texture to a text selection by importing a scanned pattern into an Illustrator 88 document, typing a letter or a word, placing it behind the texture, and defining the text and the mask in the Paint dialog box.

Both FreeHand 2.0 and Illustrator 88 let you fill a letter with a shade or pattern, or change the stroke weight or shade of its outline. "Illustrator and FreeHand Effects" shows how you can alter text with a PostScript graphics program.

Although PostScript graphics programs let you alter the basic orientation of a letter, you can't edit the letter's outline, elongating just the left-hand leg of an *M*, for example. At least you couldn't until recently. Now there are several ways to access character outlines. The folks at Adobe still won't let you tinker with their font outlines, but they were thoughtful enough to include two character sets in the form of PostScript Outlines in their Collector's Edition I clip art package. The two character sets—a sans serif and a serif—include the letters, numbers, and punctuation of a regular font, but they're made up of PostScript points, lines, and curves that can be opened and edited with Illustrator 88. You can treat the characters as you would any other PostScript graphic, adding or deleting points, reshaping or resizing characters, and generally distorting them to your heart's content.

Image Club Graphics offers outline fonts as well, but they are far from generic. Image Club's Design Letters are Illustrator outline versions of the company's predominantly decorative fonts. Like the Collector's Edition outlines, Image Club's can be modified in a PostScript graphics program like Illustrator 88 or FreeHand. The fonts have names like Rock-A-Billy, Surf Style, and Neon, so you may not want to base your corporate identity on them. But if you're modifying fonts, chances are you're aiming to turn some heads—so take a look at Image Club's offerings.

If your tastes fall somewhere between the bland and the offbeat, you probably wish you could make outlines of some nice middle-of-the-road fonts and edit those. Thanks to FontLiner, a new program from Taylored Graphics, you can do just that. FontLiner automatically creates an outline version of any font forged with Altsys's pioneering digital type foundry, Fontographer (many Mac font developers use Altsys's program to create their fonts). You simply open Font-

Liner and click a few buttons, and it outlines either an entire character set (including accents and other special characters) or a partial character set, depending on your specifications. Like the prefab outline character sets just described, those produced with FontLiner can be edited in FreeHand or Illustrator 88 to create striking graphic effects. "Automatic Outlining" shows two outlined letters from Compugraphic's ITC Novarese face.

Design Your Own

Type design has been a secret dream of many a Mac owner ever since the LaserWriter reared its built-in fonts. And many talented amateurs have realized their aspirations, thanks to Fontographer. Browse the Mac section of almost any online service, and you'll find a selection of homemade PostScript fonts (some of them quite good) that were created with Fontographer. But although it's relatively affordable and easy to use, Fontographer isn't just for amateurs; most of the commercially available Macintosh PostScript fonts (some notable exceptions are those from Adobe, Bitstream, Monotype, and Varityper) were produced with Fontographer.

Unfortunately, not every budding typographer has the time, energy, or talent to make a custom face with Fontographer. Type design is, after all, an art. If you're looking for a middle ground between designing a font from scratch and using an off-the-shelf typeface, you might be in the market for a text-effects program. Two such programs have been available for some time: Postcraft International's Laser FX and London Pride's LP Text each offer an array of prefab (but editable) special effects that you can apply to Adobe's fonts as well as to those from other manufacturers (see *Reviews, Macworld,* April 1988 for more on these programs). But these programs don't let you alter the shapes of individual letters. If you don't think of yourself as a type designer, but as more of a type stylist, you might be a candidate for a program like Brøderbund's TypeStyler or Letraset USA's LetraStudio. Both of these programs let you alter existing fonts in weird and wonderful ways. Neither of the programs was shipping at press time, but I was able to obtain previews of both.

Brøderbund's TypeStyler lets you apply special effects to any font created with Fontographer. TypeStyler offers over 30 predefined effects: you type in the text you wish to modify; select a font, size, and style; and choose the effect you need from a scrollable list. Although the effects themselves are canned, you can alter aspects of each one, adding your own artistic signature to letters or words.

SPECIALTY FONTS

For those of you whose type-design needs reach beyond the pale of the average, everyday font, here's a list of specialty fonts and the companies that offer them.

Arrows:	EmDash
Bar code:	NeoScribe International
Borders:	Altsys
	Dubl-Click Software
Bullets/boxes:	Caseys' Page Mill
	EmDash
Chemical structures:	Allotype Typographics
Chess diagrams:	Ecological Linguistics
Dingbats/pictorial:	Adobe Systems
	Image Club Graphics
	Linotype
	MacTography
	Page Studio Graphics
	Studio 231
	Olduvai Corporation
Fractions:	MacTography
	NeoScribe International
Decorative initial caps:	The Electric Typographer
	Image Club Graphics
	NeoScribe International
Keyboard layout:	Page Studio Graphics
Map symbols:	Adobe Systems
	Linotype
	Page Studio Graphics
Math/science:	Adobe
	Design Science
	Linguists' Software
	Linotype
Musical notation:	Adobe
	Coda Music Software
	Linotype
OCR:	Adobe Systems
	NeoScribe International
Small caps:	Allotype Typographics (in a serif font)
	MacTography (in Times and Helvetica)





With TypeStyler, you can resize, reshape, mirror, distort, skew, and rotate text selections. You can do anything from making a word look as if it's seen through a fish-eye lens to stretching it like a piece of taffy. You can also alter a selection's stroke weight and fill color, adding grays, colors, patterns, or gradient fills to letters. TypeStyler offers a number of shadow options, too, allowing you to adjust a shadow's color, angle, and position. And the program attends to detail—letting you adjust kerning, letter spacing, and word spacing.

You can print TypeStyler documents directly from the program or save them in several standard graphics

CONFLICT AND RESOLUTION

Are you suffering from the heartbreak of font ID-number conflicts? Do you tear your hair and rend your garments every time your printed or displayed documents appear in a completely unexpected typeface? Take heart; there is a cure.

Every Mac font is assigned an ID number by its manufacturer. Unfortunately, until recently there weren't enough numbers to go around. The Mac's original font-numbering scheme had Mac font vendors sharing only 128 ID numbers. Since every font family needs a separate number for each style (usually plain, bold, italic, and bold-italic), ID numbers were in short supply. In fact, companies with large numbers of fonts found themselves duplicating ID numbers internally.

Apple did its bit to alleviate the problem by having Font/DA Mover watch for conflicts. If you use Font/DA Mover to install a font with ID number 146 in the System file, for example, and then you later install another font that happens to have the same ID number, Font/DA Mover renumbers the second font. Likewise, if you use font/DA extenders—like Fifth Generation Systems' Suitcase II or ALSoft's Font/DA Juggler Plus or Master Juggler—to place your fonts into suitcase files, Font/DA Mover resolves conflicts within each suitcase. (A suitcase, by the way, is a collection of fonts represented by a suitcase icon.)

So far, so good. But if you print a document from a Macintosh with a different System file, or open several suitcase files with a font/DA extender, you may encounter a conflict. The results vary: one of the fonts may not show up in the program's font menu; the font's name may show up on the menu but the corresponding screen font may be altogether different; or everything may look fine on screen but the document will print in the wrong font.

Fortunately, several solutions exist. For one thing, the number of available font ID numbers has dramatically increased: Apple's new NFNT (New Font) numbering scheme offers 32,768 possible ID numbers—a vast improvement over 128. In addition, Apple is making an effort to assign each Mac font developer a specific range of ID numbers, minimizing potential conflicts.

Also, Suitcase II, Font/DA Juggler Plus, and Master Juggler include utilities that resolve ID number conflicts. With one of ALSoft's utilities, Resource Resolver, you select a group of suitcase files, click a button, and any conflicting font numbers are renumbered. Font/DA Utility, also from ALSoft, lets you manually rename or renumber fonts. Fifth Generation's Font Harmony resolves ID number conflicts among fonts installed in suitcases or in the System file.

If you use just a few fonts, your best bet is to place them all in the System file. But if you use dozens, I recommend the conflict-resolution services of a font/DA extender. Thanks to these, the increase in available ID numbers, and the assignment of number ranges to font developers, many Macintosh publishers will be spared the frustration of untangling font ID number conflicts.



formats. Like FontLiner, TypeStyler can save letters as PostScript outlines, complete with editable anchor points. You can export the letters to graphics or page-layout programs and incorporate them into other documents. You can also import graphic images into TypeStyler and superimpose text over a picture.

Letraset's LetraStudio takes a different approach to font editing. Like TypeStyler, LetraStudio enables you to reshape text to create dozens of effects, from rippled letters to curves, arches, and perspective views. But LetraStudio doesn't let you manipulate typefaces from other manufacturers; instead, you work with a set of fonts that comes with the program.

To enter text, you simply select a font from the LetraFonts collection and start typing. You can then select one or more of the program's effects to reposition or reshape a word's baseline, skew or distort a word, create a drop shadow, overlap letters, scale or rotate a selection, change stroke weights or fill colors, and more. LetraStudio's Envelope menu lets you surround text with one of 18 basic shapes, which have movable handles attached. Drag one or more envelope handles to bend, stretch, shrink, curve, or slant the enclosed text. LetraStudio also includes some basic drawing tools—line, circle/oval, square/rectangle, and arc—that work with the program's text effects. Don't mistake LetraStudio for a drawing program, however; the drawing tools merely augment the program's many special-effects options.

You can adjust attributes such as kerning, tracking, and font size as you work, viewing the effects on screen and periodically printing proofs to see how an effect is coming along. You can even select a single letter in a word and apply an effect to it.

LetraStudio's effects can be printed directly from LetraStudio or saved and pasted into other applications, including page-layout programs. If you wish, you can save an effect in PICT or EPS format, paste it into a graphics program, and incorporate additional graphics. "New Faces" shows samples of special effects created with TypeStyler and LetraStudio.

KERNING UTILITIES

If you're more concerned with making your documents look professionally typeset than you are with creating splashy headlines or logos, you might be interested in a new kerning utility. Most Mac PostScript fonts have from 100 to 500 built-in kerning pairs, letter combinations such as *Ty* that would look awkward if they didn't overlap a bit. These built-in kerning pairs are recognized by page-layout programs, typesetting programs, and even some graphics programs (but not by word processors).

In the majority of Mac fonts, the kerning pairs look just fine, but now and then you might see a pair of letters that doesn't meet your aesthetic standards. Maybe it is indeed poorly executed (or nonexistent) kerning, or maybe you simply disagree with the type designer's opinion of correct character spacing. Whatever your reason for wanting to change kerning, it's tedious to manually adjust a poorly kerned letter pair every time it appears. EDCO's LetrTuck utility lets you adjust kerning pairs for any font and permanently save the changes. No more searching for offending letter pairs and adjusting them by hand.

To use LetrTuck you merely choose the font you want to edit, select a kerning pair from a displayed table, and adjust the kerning in a dialog box (see "Getting Closer"). Repeat this procedure for as many letter pairs as necessary and save the file. The information is attached to the font, no matter which application you type it in (assuming the application supports automatic kerning). If you print a sample and don't like the results, you can reenter the file and fine-tune the kerning.

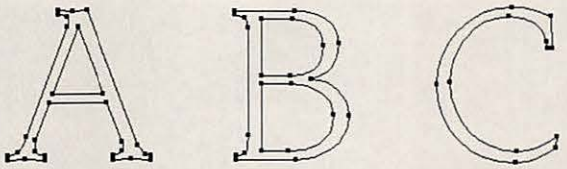
MacKern, a similar kerning program from ICOM Simulations, should be out by the time you read this, but was not available at the time this was written.

Better-Looking Screen Fonts

Now that you've optimized your printed text, you can bring the text displayed on the screen up to par. Most PostScript fonts come with five sizes of screen fonts, usually 10-, 12-, 14-, 18-, and 24-point. If you type some text in an uninstalled size (say, 20-point text), the Mac uses installed sizes to compute the new size, which often produces screen fonts that are jagged and barely readable (see "Readable Screen Fonts"). The printed output will look OK, of course, since the LaserWriter and other PostScript printers create their fonts from scalable outlines. But it's annoying to look at illegible screen fonts; you want the displayed layout to match the printed one as closely as possible. U.S. MicroLabs's FontSizer can produce readable screen fonts at sizes ranging from 13 to 127 points. The new sizes can be installed in the System file with Font/DA Mover or used with a font extender such as Suitcase or Font/DA Juggler, just like the screen fonts that come with the PostScript fonts you buy.

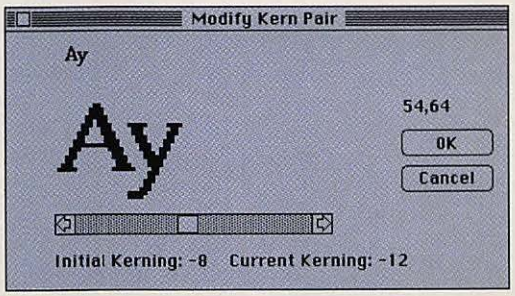
It Slices, It Dices

I can't close without mentioning one of my favorite multipurpose font utilities: Jeff Schulman's FontDisplay. It displays—and prints out on request—a host of information about the fonts installed in your Mac. FontDisplay can print out a font's entire ASCII character set (including, if you wish, the keystroke combination required to type certain characters); tell you a selected font's ID number, its location on disk, sizes



Automatic Outlining
FontLiner converts characters created with Fontographer into PostScript outlines, that can be edited with a graphics program.

installed, and even characters per pica for the selected size; print a sheet of four keyboard layouts à la Key Caps, with plain, Shift, Option, and Shift-Option keystrokes displayed; or print a catalog of all the fonts



Getting Closer
If you're not satisfied with a face's built-in kerning pairs, EDCO's LetrTuck gives you the ability to change them. Your newly assigned kerning information is attached to the font and applied when you type text in any program that recognizes such information.

in a selected disk or folder. FontDisplay can also print a list of all installed fonts, sorted by name or number—a valuable aid in spotting and eliminating ID number conflicts (see "Conflict and Resolution").

Whether you're printing a book or a party invitation, you can benefit from the Mac's ability to customize and fine-tune fonts. The Mac has put the art of type

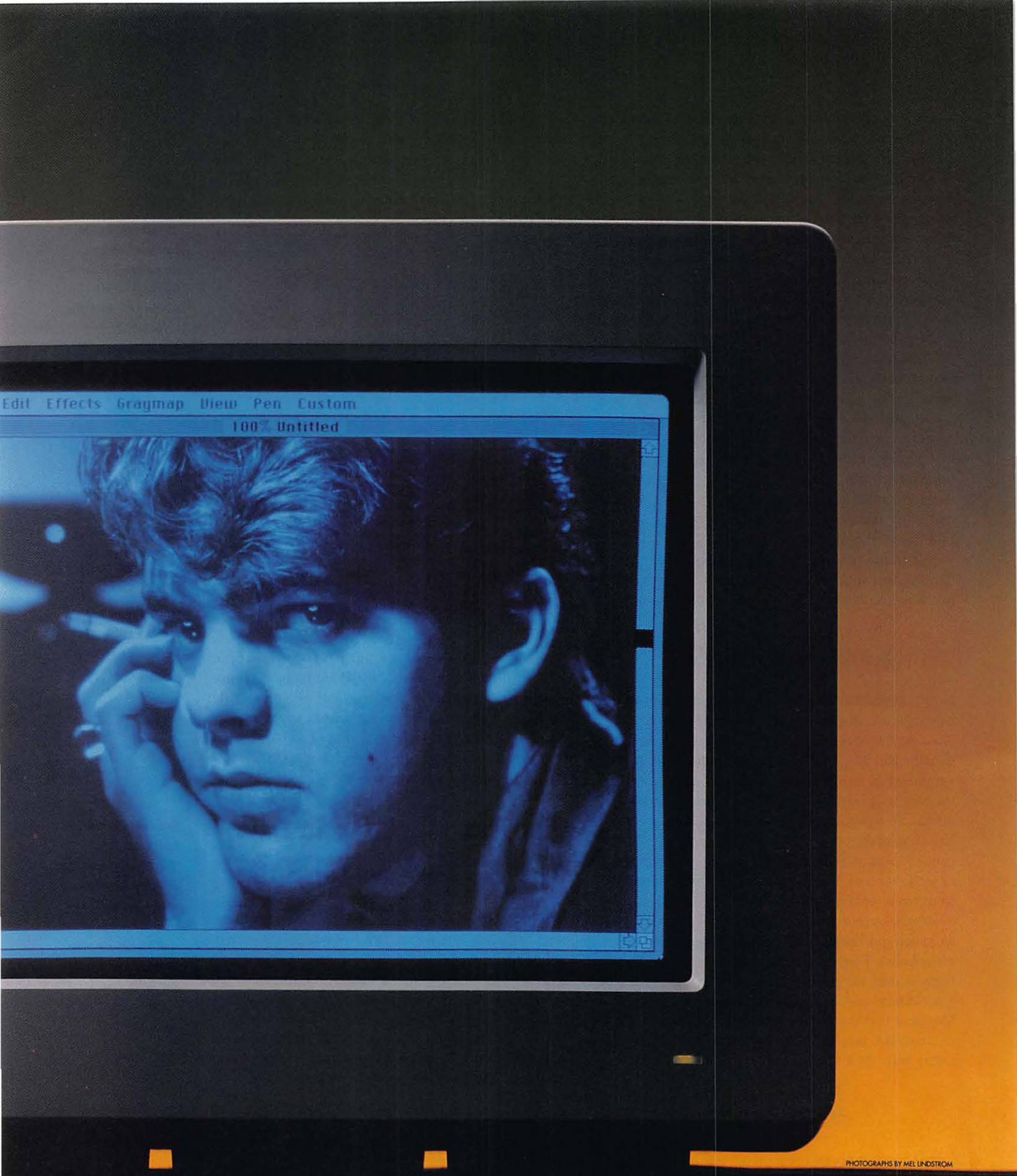
The first man was an artist

The first man was an artist

Readable Screen Fonts
Most Mac typefaces come with only a few sizes of screen fonts, making some screen type hard to read. FontSizer uses information from a printer font file to create readable screen fonts in almost any size.

design into the hands of the people. There are those who feel that a fine art has been indiscriminately handed to the unwashed masses. And, just as many novice desktop publishers turned out atrocious page layouts, amateur typographers will no doubt butcher innocent typefaces in their quest for unique designs. But look at the bright side: the Mac also brings the art of typography to individuals who have the talent but never had the tools to put their ideas on paper. ■

Erfert Fenton *was editing computer publications when computers that now fit on your thumbnail filled entire rooms. She is a* Macworld *contributing editor and the author of* The Macintosh Font Book *(Peachpit Press, 1989).*



PHOTOGRAPHS BY MEL LINDSTROM

getting down to

BLACK & WHITE

EVALUATING MONOCHROME AND GRAY-SCALE MONITORS

BY BRUCE F. WEBSTER

You might wonder why anyone would want a monochrome or gray-scale monitor instead of a snazzy color monitor. Monochrome and gray-scale monitors are cheaper, sharper, lighter, smaller, and redraw the screen quicker than color monitors of equal resolution. Color monitors are sexier, but black-and-whites still get the job done.

This semiannual monitor roundup focuses on monochrome and gray-scale monitors for the Mac SE and the Mac II. Except for the Princeton Max-15, all of the products are treated as monitor/video board pairs, since each monitor requires a specific video board from the monitor's manufacturer. I tested each monitor for clarity and sharpness, visual defects (such as distorted edges and corners), flicker, and overall quality of display. Other major considerations include software features, software support, and monitor controls (see "How Much Monitor Do You Need?").

APPLE COMPUTER

Apple monitors have been and remain the standard by which other monitors are judged. The 12-inch Apple High-Resolution Monochrome Monitor for the Mac II has a 256-level, gray-scale display that is crisp, free from distortion, and rock solid: it doesn't wiggle, flicker, or ghost. Since it's small, it's inexpensive compared to the other monitors, and it comes in an attractive case. (The photograph on the opposite page shows the Apple High-Resolution Monochrome Monitor.) Its resolution is 640 by 480 pixels, at a pixel density of 72 dots per inch (dpi). (That density is the Apple standard; most of the monitors in this roundup have the same density, although some have higher density to achieve higher resolution.)

Unfortunately, that same monitor, which seemed so large compared to the classic Mac screen, now seems small compared to all the other noncolor monitors—which is why Apple has come out with two gray-scale monitors for the Mac II. One, the Workstation Display, offers 1152 by 870 pixels for a density of 77 dpi. The smaller Portrait Display offers 640 by 870 pixels for a density of 80 dpi (see "The Compact Mac," in the April 1989 issue of *Macworld*). As I was writing this, I was only able to view a preproduction model of the Workstation Display. It had a clear, crisp display; however, final judgment will have to wait until I see a shipping version. Apple still does not provide any monitors for the Macintosh 512KE, Plus, or SE. That's too bad, since Apple's monitors have such high quality.

CORNERSTONE TECHNOLOGY

The DualPage for the Mac II or SE uses a relabeled Sampo 19-inch monochrome monitor, along with Cornerstone's own video board, which provides a resolution of 1152 by 896. Its vertical resolution is a bit higher than most of the other monitors', which makes a difference with page-layout programs, such as PageMaker and ReadySetGo, because it lets you fit a full page on the screen with room left over for the menu bar and window borders.

The display is crisp, with no blurring, although there is a slight bowing along the left and right edges. As for software support, the manual makes reference to a disk with a screen saver program, but no such disk accompanied the monitor.

E-MACHINES

E-Machines offers a new gray-scale monitor for the Mac II and SE, The Big Picture Z21 IQ, as well as The Big Picture monochrome monitor. The monochrome monitor comes with interface boards for the Mac II, SE, Plus, and 512KE. The Big Picture is designed with a large hollow in the right side of the back that allows a classic Mac or a Mac II to snuggle in behind the monitor, cutting down on the overall footprint.

The Z21 IQ is a 21-inch gray-scale monitor that takes an idea pioneered by Radius—a virtual screen that's larger than the actual screen—and expands upon it greatly. A virtual screen extends beyond the physical bounds of the display; when you move the cursor toward the edge of the display, the display scrolls more of the screen in from that edge. This is called panning, and the Z21 IQ does it very smoothly.

The actual display has a number of resolutions, ranging from 576 by 432 (36 dpi) to 1280 by 960 (80 dpi). The virtual screen, however, can extend beyond those bounds in different ways, giving you resolutions as high as 4096 by 2048, 8192 by 1280, and 10,240 by 960. A Control Panel utility lets you choose from a number of predefined settings or create your own. The three controlling factors are pixel density (36, 40, 72, and 80), maximum shades of gray (2, 4, 16, 256), and how much memory is on the board (256K to 1.25MB); these determine the maximum size of the virtual screen, and you can adjust it from there.

E-Machines' software provides a number of features that help you keep track of where you are in these large displays: automatic centering of windows (just dialog boxes or all windows), menu tracking (keeping the menu bar at the top of the screen as you pan), changing the pixel density while working (giving you a zoom effect). You can also adjust brightness and contrast from within the Control Panel, and set the amount of time that passes before the screen saver activates, as well as set the brightness level for automatic dimming of the monitor if you leave the Mac for a while.

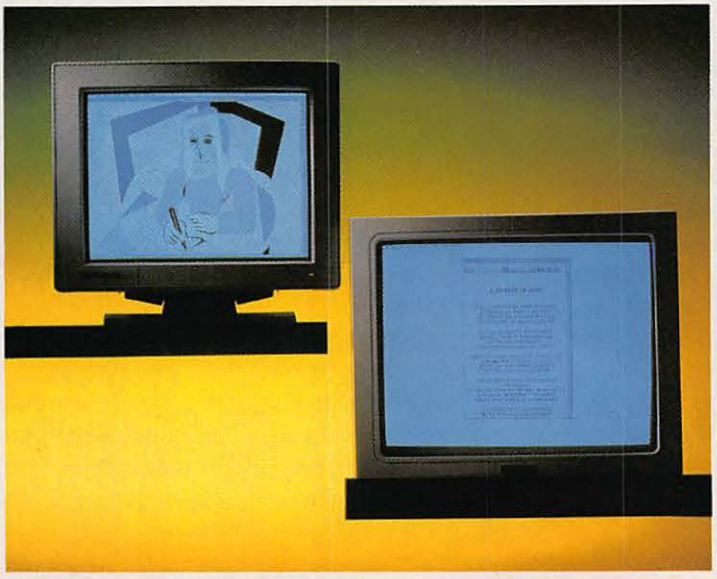
All of these great software features require the new 32-bit QuickDraw routines. Since Apple has not announced these routines yet, E-Machines provides them for you. However, you must have System 6.0.2, or a later version, to use them. Also, programs that do not support the 32-bit routines yet, such as Adobe Illustrator, will not run on the Z21 IQ.

The Big Picture Z21 IQ's display is free from any video defects; the phosphor has a bluer color and is faster than that of the original Big Picture monitors. The Z21 IQ however, just isn't as crisp and clear as some of the others. A final note: E-Machines makes a more limited version of this monitor for the Mac II (the Z21 IQ with only 2 or 4 shades of gray), as well as a monochrome version (the Z21 SE) for the Mac SE.

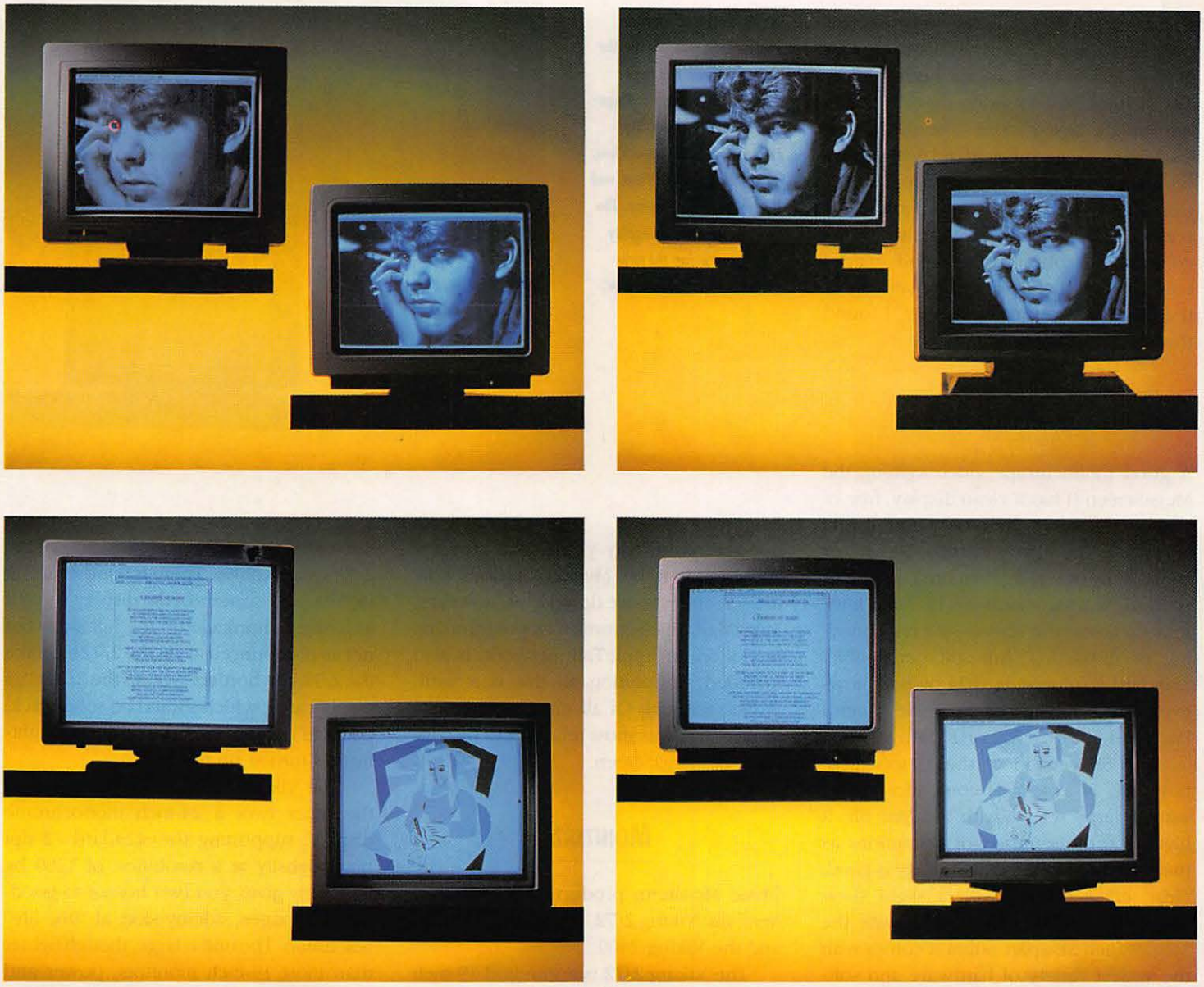
The Big Picture monochrome monitor has a very sharp and clear display when used with a Mac II. Since it fits a 1024-by-808 resolution into a 17-inch monitor, the



Shown here, in order, are the Nutmeg 19, Taxan Crystal View, Sigma Designs L View, Moniterm Viking 2/72 GS, Sigma Designs SilverView 21 inch, and SuperMac Spectrum/8 Grayscale. Except for the 21-inch SilverView, all of these monitors are 19 inch and can, therefore, display nearly two full pages of text at once. All of the monitors display gray scales, although the number of levels varies.



In order, the IDT Systems Mirage Display System, Moniterm Viking 2400, E-Machines Big Picture Z21 IQ, Radius Two Page Display, Moniterm Viking 2/72, and the Cornerstone DualPage Display. Some monitors have text on the screens. At press time, Adobe Illustrator did not run on these monitors. The new version of Illustrator, 1.8, runs on all monitors except the E-Machines Big Picture Z21 IQ.



pixel density is higher than a classic Mac monitor's: 85 dpi, instead of 72. (On the same size monitor, an increase in pixel density creates smaller characters.) But since the display is so crisp, images are clear and text is just as readable at 85 dpi as it is at 72 dpi—even with small font sizes. There are no video defects; however, the CRT is curved enough to make the picture appear slightly bowed. The phosphor is different from that in most of the other monitors—it's slower and has a greenish tint. The slower phosphor creates a small but perceptible delay in images appearing and disappearing. Without saying anything, I had a friend try out the display; that person immediately commented on the color and speed. You should definitely try this monitor out before you buy one, just to be sure it's acceptable to you.

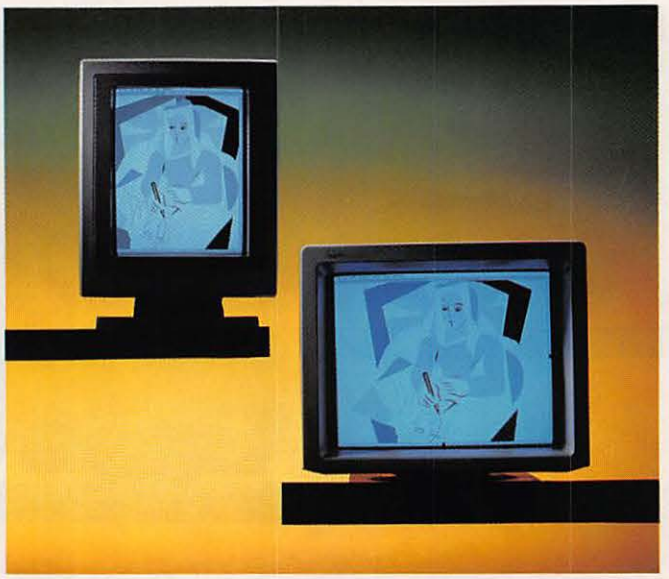
The display on The Big Picture for the SE is just a touch less sharp, but again there are no video defects (though the phosphor is the same). In fact, the only problem with the Big Picture display is the short (21-inch) video cable, which sharply limits the distance between the monitor and the computer. If you keep the CPU to one side or under your desk, you'll need more cable than this in order to place your monitor exactly where you want it.

IDT Systems

Designed exclusively for the Macintosh SE, the Mirage I Display System monochrome monitor has a resolution of 1024 by 768. The interface board has a clean, surprisingly sparse design; it has so few chips that I expected to find a second board to hook into it. A different version of the Mirage board has identical features but lets you hook two Mirage 20-inch monitors to the Mac SE, giving you the largest possible display area.

The video board makes no use of the SE's screen, which keeps its Welcome to Macintosh box up. The accompanying

software (an INIT) allows you to select either the Mirage screen or the Mac screen at start-up, but you can't use both at once. The display has no video defects: edges are straight, text is crisp. The picture on the Mirage monitor I received was slightly off-center, though, making me wish for an external H-POS (horizontal position) control. The monitor could also use a contrast control, since text and images tend to look slightly faded, regardless of the brightness setting. However, I found this monitor easy on the eyes.



In this last set of monitor photographs, you can see the Nutmeg/Xerox Full Page Display, MegaGraphics MegaScreen II, E-Machines Big Picture, SuperMac SuperView, Sigma Designs PageView, and Radius Full Page Display. The two monitors which display text can now run the new version of Adobe Illustrator.

MegaGraphics

A good monochrome video system, the MegaScreen II has a clean display, free of visual defects. On the other hand, it isn't as crisp as the Apple 12-inch display (or some of the other large screens), and there is a slight video beat—very faint lines moving across the screen—it's not annoying or distracting, but still perceptible. Standard resolution is 1024 by 832; however, you can adjust that (on the Control Panel) to 1024 by 768 or 1024 by 900.

The SE version of the MegaScreen, however, is a serious contender if you want a large screen with the Mac SE. It gives you the same set of resolutions as the Mac II version. Picture quality is good: clear, crisp, though with a slight skew along the bottom edge. What sets the MegaScreen SE apart is that it comes with the widest variety of hardware and software options of any of the monitors discussed in this article. Like the Mac II version, the MegaScreen SE supports several output devices, including different monitors and large-screen projection systems; it also has a socket for an optional 68881/68882 math coprocessor.

In addition, you can set menu bar and cursor sizes, select a screen, and set the relative positioning of the image on the MegaScreen SE and Mac displays. A utility, MegaZoom, doubles the size of an SE's image and displays it on a MegaScreen monitor or another output device. Using MegaZoom you can work on the SE's screen while your audience views the same image, only larger, on the MegaScreen. What's more, the display is sharp, not grainy the way you might expect a zoom mode to be. MegaZoom does slow the screen response down a bit, however. MegaMail, an electronic mail program that works on an AppleTalk network, is also included. Supporting all this is a well-written manual. Of all the SE monitors I looked at, I was most reluctant to disconnect the MegaScreen.

Moniterm

Three Moniterm products are evaluated here: the Viking 2/72, the Viking 2/72 GS, and the Viking 2400.

The Viking 2/72 is a standard 19-inch monochrome monitor for the Mac II and SE; nothing fancy, just a large screen with a lot of pixels on it. It has the same pixel density as the Apple monitors (72 dpi), with a resolution of 1024 by 768. Brightness and power controls are in front and easy to reach. The display on the 2/72 isn't as crisp or as straight as you might want. There is slight blurring in the upper left corner, noticeable mostly because the Apple logo is there. A more serious problem: the screen image is shorter on the left edge than on the right, with the bottom slanting up from right to left.

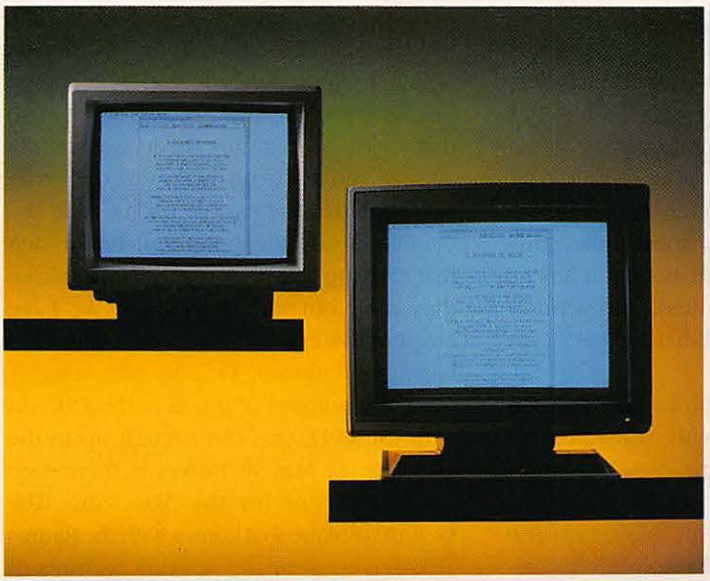
The Viking 2/72 GS is a gray-scale version of the Viking 2/72. Besides having all of the 2/72's features, it supports 2, 4, 16, or 256 shades of gray. Unfortunately, the Viking 2/72 GS also shares most of the 2/72's video flaws. There is some blurring in the upper corners of the display, as well as a slight shrinkage on the left side (but not as pronounced as on the 2/72). Unlike the 2/72, the borders around the 2/72 GS's display area, which should be solid black, become noticeable if the screen's brightness is turned up too high.

The Viking 2400 is the big brother to the other two: a 24-inch monochrome display, supporting the standard 72 dpi pixel density at a resolution of 1280 by 960. This gives you two honest-to-goodness full pages, side-by-side, at "true life" resolution. The unit is large, though lighter than most 19-inch monitors; power and brightness controls are on the back.

As with the other two monitors, the bottom edge of the display image slants up from right to left. In this case, however, the entire image appears to be similarly skewed, resulting in a slight clockwise rotation. The menu bar appears to be squashed up against the top of the screen. All in all, the Viking monitors are somewhat disappointing, especially given the high quality of the unit reviewed last year.

Nutmeg Systems

The Nutmeg 19 uses the Sampo 19-inch monitor identical to the one from Cornerstone Technology; however, the Nutmeg





video board gives it a slightly lower resolution of 1024 by 768. The display is clear and crisp, with no visible bowing or other distortion along the edges. There is some ever-so-slight blurring along the right edge, and the display is slightly off-center horizontally (toward the right), but these are very minor faults.

The Nutmeg/Xerox Full Page Display has a screen that is roughly the size and proportion of a standard sheet of typing paper, being much taller than it is wide. This monitor's display area is 8½ inches wide, 11 inches high and gives you room for a full page (and then some) on the screen.

The display is clear and clean; the only bowing is due to the shape of the CRT itself, though there is a touch of pinching at the upper corners; that is, it looks as though something is pinching the edges in. The main drawback to using the Nutmeg/Xerox as a second monitor is that it generates interference with Apple's monochrome monitor; the interference is faint but noticeable, and (after a while) it can become annoying.

Princeton Graphic Systems

Princeton's Max-15 is the only monitor in this bunch designed to compete directly with Apple's 12-inch monitor. It's a 14-inch gray-scale monitor that can be used

HOW MUCH MONITOR DO YOU NEED?

There are four major considerations in buying a monitor: cost, resolution, fidelity, and shading. Once you've decided what you can afford, the other three factors come into play.

RESOLUTION

The number of pixels on the screen determines how much you can see at once. This is usually expressed as two values: the number of pixels per line and the number of lines on the screen. For casual use, the Mac SE screen (512 by 342) is tolerable, and Apple's 12-inch monochrome monitor (640 by 480) for the Mac II is adequate. If you're doing word processing on a professional level, you'll probably want at least a full-page display, something that lets you see as many lines of text at once as possible. For desktop publishing, you need width as well as height, so that you can see the document all at once. You need a bit more height to see a full page all at once, since page-layout programs usually require extra space around the document being pasted up. For engineering applications, such as CAD/CAM and 3-D graphics, you want as much resolution as you can afford.

FIDELITY

The correspondence in size between the screen and the printed page determines how easily you can read the display and how much the screen display resembles what you get out of the printer. This is indirectly expressed as the pixel density: dots per inch, or the number of dots it takes to make a 1-inch horizontal line on the screen. The Mac SE and Apple 12-inch monochrome monitors both display at 72 dpi, which corresponds closely to what you'll get out of an ImageWriter or LaserWriter printer. For a screen of a given size, higher resolution requires higher pixel density, which means smaller text and images; you trade off fidelity for resolution. What you choose depends on your eyesight, rather than your application; however, for certain page-layout efforts you may want true fidelity to compare images on the screen with physical objects.

SHADING

Shading is expressed in terms of bits per pixel and shades of gray. The Mac SE monitor has just one bit per pixel, giving two shades: black and white. The Mac II Video Card can support 1, 2, 4, or 8 bits per pixel, giving 2, 4, 16, or 256 levels of gray, respectively. Unless you're doing artwork or scanning in images, monochrome is probably enough; if you are doing either of those, though, you'll probably want a full 256 shades of gray.

either with the Mac II or with the IBM PC and PS/2 systems. It's smaller and lighter than the Apple monitor and (unlike the Apple) comes with a built-in tilt-and-swivel stand. It uses Apple's Mac II video board. Since the monitor is designed to be used with a number of systems, it has controls for horizontal, vertical, size, and position in the back. (The Max-15 is not pictured because we accidentally returned the monitor to Princeton Graphics before it was photographed.)

The display is clear and steady, and there are no visual distortions at normal settings. The image is rotated clockwise just a touch however. It was hard to tell if that was an electronic problem or some slight misplacement of the CRT. The screen's phosphor has an almost amber cast, as compared to the blue gray cast of the Apple monitor. The manual (just a folded pamphlet) says that for the Mac, the Max-15 should be set for overscan, and then the image size should be adjusted. When I did this, the active display filled the 14-inch screen completely, giving the illusion of bending back slightly at each of the CRT's corners. On the other hand, using underscan mode you can leave a border around the active display and adjust images and text to 72 dpi.

RADIUS

Most early Mac owners (myself included) drooled at the thought of a Radius Full Page Display (FPD) monitor sitting alongside a Mac. Four years later, the FPD still looks good, even though its resolution (640 by 864) isn't that spectacular compared to the new monitors. Still, it has no visual distortion, crisp text, and a phosphor/screen-filter combination that's easy on the eyes.

Like the MegaGraphics displays, the Radius FPD comes with software that gives you a few options. You can make the menu bar larger, so that it's more visible and easier to hit. You can also increase the horizontal resolution to create a virtual screen. The resolution doesn't change; instead, the screen image extends beyond either side of the display itself. When you move the mouse to one edge of the screen or the other, the image scrolls in from that side.

With the Mac SE (or Mac Plus), the Radius FPD shifts from being a nice accessory to being a dramatic improvement over the standard Mac screen. You don't lose the Mac screen, either. In fact, the accompanying software—which you invoke at start-up—gives you a variety of options. You can use just the Radius FPD, just the Mac screen, or both; you decide which is on the left side and which is on the right; you can align the two screens, so that an image spanning them goes straight across; and you can make all the other settings that are possible on the Mac II.

Obviously, the people at Radius felt that viewing one page was not enough, so they came out with the Radius Two Page Display System (TPD). The Radius TPD has a resolution of 1152 by 882, roughly twice the number of pixels as the FPD. As with the FPD, you can hook it up to the Mac II or the Mac SE; however, there is no interface board for the Mac Plus. The system software that comes with the Radius TPD has most of the relevant features of the FPD software, plus a few nifty enhancements, including tear-off menus and a feature for tracking the cursor's location.

Visually, however, the Radius TPD is a bit of a disappointment compared to the FPD. The screen is very bright, a rather light-colored black unless the brightness is turned down significantly—in which case the overall image is a bit too dim. And unlike the FPD, the TPD has a number of visual defects, including bowing along the left edge, and distortions along the top and bottom edges. All of these factors

MONOCHROME MONITOR ROUNDUP

	Apple High-Resolution Monochrome Monitor	DualPage	The Big Picture	The Big Picture Z21 IQ	Mirage I Display System	MegaScreen
Company	Apple Computer	Cornerstone Technology	E-Machines	E-Machines	IDT Systems	MegaGraphics
Diagonal size (in inches)	12	19	17	21	20	19.5
Display area (in inches)	8.5 by 6.3	13.8 by 10.8	13.5 by 10.5	16 by 12	14.25 by 10.75	14 by 11
Active Resolution (in pixels)	640 by 480	1152 by 896	1024 by 808	to 1280 by 960	1024 by 768	1024 by 832
Virtual resolution (in pixels)				to 5210 by 2048		1024 by 768
						1024 by 900
Pixel density (in dpi)	72	81	85	36, 40, 72, 80	72	75
Levels of gray	2, 4, 16, 256	2	2	2, 4, 16, 256	2	2
Refresh rate	66.7Hz	64.6Hz	60Hz	69Hz, 76Hz*	68Hz	up to 70Hz
Horizontal scan rate	35kHz	63.9kHz	50.5kHz	68.4kHz	63kHz	59.5kHz
Hardware	Mac II	Mac II, SE	Mac II, SE, Plus	Mac II, SE	Mac SE	Mac II, SE, Plus
Cost with Mac II board	$1047	$1698	$1795	$2795	n/a	$2290
Cost with Mac SE board	n/a	$1698	$1695	$2395	$1995	$2020
Cost with Mac Plus board	n/a	n/a	$1695	n/a	n/a	$2090

** Multiple refresh rates correspond to multiple resolutions.*

combined make me want to look at this one carefully before buying it.

Sigma Designs

The Sigma Designs gray-scale display is more impressive than it was the last time I looked at it. The L View (formerly LaserView) still crams more pixels—1664 by 1200—into a 19-inch display than anyone else on the market, and it lets you choose between monochrome and four shades of gray. Of course, you need to have fairly sharp eyesight to work at that resolution for any length of time, but the display is amazingly crisp and sharp, free from almost any visual distortion. Options include the ability to shift to an 832-by-600-pixel display, which gives you a display that's still larger than the Apple monochrome monitor, but easier to see (effective pixel density of 60 dpi) because text and images are larger than normal.

After the L View, the SilverView S8 256 for the Mac II is a slight disappointment. Yes, it offers full 256-level gray scale, with an 1152-by-870 pixel display. But its visual quality isn't as good as the L View's, there's very noticeable blurring along the left and right sides, some bowing toward the left side of the screen, and a squashed-looking menu bar. Sigma Designs also offers two other models for the Mac II, the SilverView M (21-inch monochrome) and the SilverView S4 (21-inches with 16 gray levels). All things considered, I'd rather have the 19-inch L View.

For the SE, Sigma Designs has three models of the PageView full-page display. The PageView offers two resolutions: 576 by 768 at 72 dpi, giving you an accurate display, and 640 by 870 at 80 dpi, which shrinks things a touch but gives you room for a full page with a border. Two of the PageView models (the PageView 100 and the PageView Plus) also offer a third, higher resolution: 800 by 1080 at 100 dpi.

The PageView has more external controls than any other monitor I examined: power, brightness, and contrast on the front; horizontal and vertical position on the back. They are all useful in tweaking the picture to rid it of some first-time distortions. The result is a good display, though not as crisp or sharp as some of the other monitors. A certain fuzziness is noticeable at the highest resolution, something of a contrast to the clearness of the L View display. All in all, the display looked best at the 576-by-768 (72 dpi) resolution. Unlike some of the other full-page displays, however, the PageView models do let you use the Mac screen at the same time.

SuperMac

SuperMac Technology has two 19-inch monitors: one monochrome (for use with the SuperView II video board) and the other gray scale (for use with the Spectrum/8 Grayscale video boards). The two monitors are identically designed.

The SuperView II system offers you a 1024-by-768 monochrome display; no real fancy features, just a large, clear display. The only video defect is a slight bowing along the left side of the top edge, and the text isn't as crisp and sharp as on some of the monitors (but it's not the fuzziest, either). In short, it's a good, basic display—nothing to jump up and down about, but it gets the job done. One last note: by changing the oscillator chip on the video board, you can increase the resolution to 1280 by 960.

SuperMac's Grayscale monitor runs on both the new SuperMac Spectrum/8 Series II card and the older Spectrum/8 board. Both boards produce a 1024 by 768 gray-scale display, which supports up to

Viking 2/72	Viking 2/72 GS	Viking 2400	Nutmeg 19	Nutmeg/Xerox Full Page Display	Max-15	Radius Full Page Display
Moniterm	Moniterm	Moniterm	Nutmeg Systems	Nutmeg Systems	Princeton Graphic Systems	Radius
19	19	24	19	15	14	15
14 by 11	14.2 by 10.7	17.75 by 13.3	13.8 by 10.8	8.5 by 11	9 by 6.8	11.5 by 8.25
1024 by 768	1024 by 768	1280 by 960	1024 by 768	720 by 900	640 by 480	640 by 864
						1024 by 864
72	72	72	72	90	72	77
2	2, 4, 16, 256	2	2	2	2, 4, 16, 256	2
66Hz	60Hz	66Hz	64Hz	60Hz	40–120Hz (autosync.)	69Hz
48kHz	48kHz	66kHz	64kHz	62.88kHz	15–36kHz (autosync.)	64kHz
Mac II, SE	Mac II	Mac II, SE	Mac II, SE, Plus	Mac II, SE, Plus	Mac II	Mac II, SE, Plus
$1995	$2095	$2595	$1699	$1299	$997 (incl. Apple board)	$1790
$1995	n/a	$2595	$1699	$1299	n/a	$1690
n/a	n/a	n/a	$1699	$1299	n/a	$1690

256 shades of gray. The display is the best of the gray-scale monitors, and is as good as or better than most of the monochromes—clear, crisp, and generally easy to look at. (Although a couple of editors at *Macworld* noticed some flicker). Like some of the other monitors, there is a hint of screen rotation; however, the edges are straight, and there is no pincushioning.

The Spectrum/8 Series II board offers a lot of new features. You can use it with the smaller Apple monitors (640 by 480) as well as with the larger SuperMac color and gray-scale monitors (1024 by 768). With the smaller monitors, you can have a virtual screen, much like that of The Big Picture Z21 IQ, though with many fewer choices and settings. The Spectrum/8 can also be configured (by adding another oscillator) to work with a variety of monitors, including multisync, PAL RGB, and NTSC RGB monitors.

Taxan

The Taxan Crystal View monitor, with interface boards for both the Mac II and Mac SE, represents Taxan's latest entry into the monitor marketplace. The monitor gives you an 1024 by 768 monochrome display. The Mac SE version comes with software that enables you (at start-up) to assign one side of the image to the Crystal View display and the other side to the Mac display and to adjust the monitors' relative heights, so that images spanning the two displays line up properly. You can also disable the Mac display, using only the Crystal View monitor.

The Crystal View display is free from most visual defects; however, despite the name, it isn't very crisp, especially toward the left edge of the screen. This is true of both the Mac II and Mac SE video boards. While the monitor is still usable, it has probably the least crisp display of all the units examined.

The Crystal View monitor comes with a detachable antiglare filter. The filter makes a real difference; the alleviation of eyestrain is immediately noticeable, it makes you feel as though you could look at the screen all day long. Some other monitors offer built-in antiglare screens, usually as an expensive ($200–$500) option; the one with Crystal View is exceptionally effective, and it's free.

What's Best

As always, you should buy the monitor that you want, regardless of what anyone else thinks. After all, you're the one who's going to have to spend countless hours in front of it. Having said that, I'll go ahead and state my preferences. If I had to pick just one monitor for the Mac SE, it would be the MegaScreen SE. The combination of a high-quality, easy-to-look-at picture and a good selection of display options makes this my favorite. On the Mac II, I like the features and the size of the Big Picture Z21 IQ (as long as I'm not using Illustrator), but I also like the crispness of the SuperMac Spectrum/8 Grayscale. Of the two smaller monitors for the Mac II, I'd take the Princeton over the Apple; the Apple has somewhat better video, but the Princeton has more features and flexibility. ◘

See *Where to Buy* for contact information.

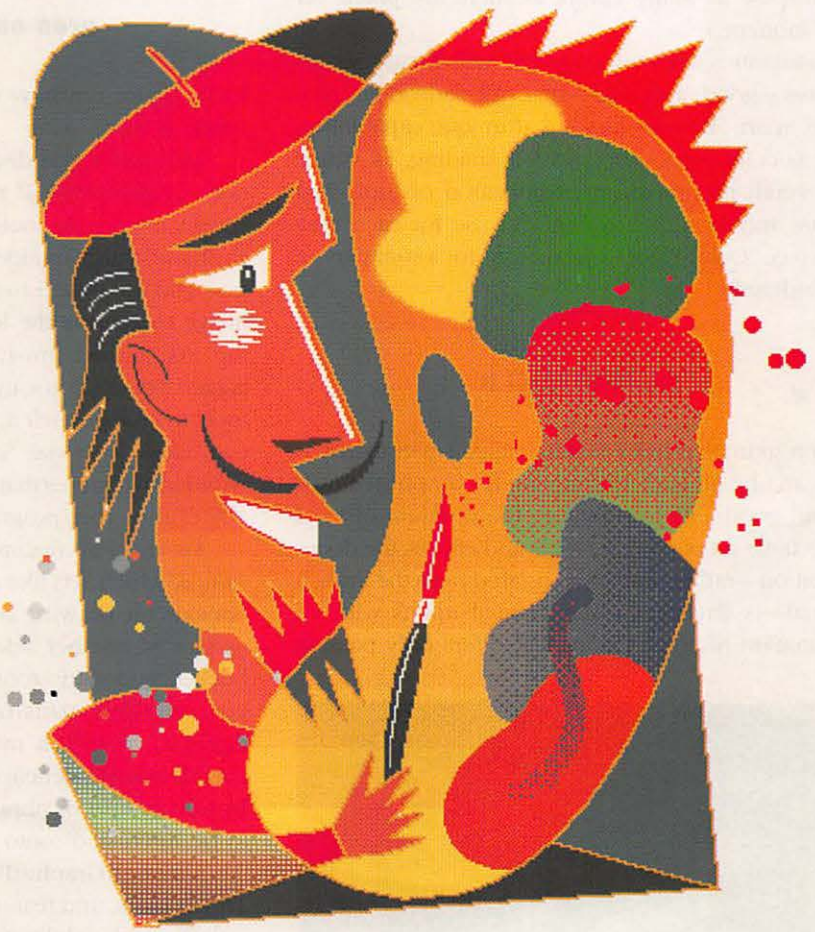
Bruce F. Webster *is a* Macworld *contributing editor and a freelance writer living out amongst the redwoods near Santa Cruz, California.*

MONOCHROME MONITOR ROUNDUP (continued)

	Radius Two Page Display System	L View	PageView	SilverView S8	Spectrum/8 Grayscale	SuperView II	Taxan Crystal View
Company	Radius	Sigma Designs	Sigma Designs	Sigma Designs	SuperMac Technology	SuperMac Technology	Taxan USA Corporation
Diagonal size (in inches)	19	19	15	21	19	19	19
Display area (in inches)	14 by 10.75	14.0 by 10.5	8.0 by10.7	16 by 12	13.8 by 10.8	13.8 by 10.8	13.6 by 10.7
Active Resolution (in pixels)	1152 by 882	1664 by 1200, 832 by 600	576 by 768, 640 by 870, 800 by 1080	1152 by 870	1024 by 768, 640 by 480	1024 by 768, 1280 by 960 (with upgrade)	1024 by 768
Virtual Resolution (in pixels)	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Pixel Density (in dpi)	82	120, 60	72, 80, 100	72	72	72	72
Levels of gray	2	2, 4	2	2, 4, 16, 256	2, 4, 16, 256	2	2
Refresh rate	71Hz	60Hz	97Hz, 86Hz, 70Hz*	73Hz	60Hz	66.14Hz	72Hz
Horizontal scan rate	65kHz	75kHz	79kHz	70kHz	48.78kHz	53.57kHz	64kHz
Hardware	Mac II, SE	Mac II	Mac SE	Mac II	Mac II	Mac II, SE	Mac II, SE
Cost with Mac II board	$2390	$2495	n/a	$2999	$3195	$2195	$1695
Cost with Mac SE board	$2390	n/a	$999	n/a	n/a	$2195	$1695
Cost with Mac Plus board	n/a	n/a	n/a	n/a	n/a	n/a	n/a

** Multiple refresh rates correspond to multiple resolutions.*

Brushes with COLOR



MAX SEABAUGH

FIVE COLOR PAINT PROGRAMS COMPARED

by Erfert Fenton

If you paint with pixels, you may find yourself overwhelmed by the number of color paint programs on the shelves. SuperMac Technology's PixelPaint and Computer Friends' Modern Artist used to be the only options. Now, with Aba Software's GraphistPaint II, MicroIllusions' Photon ➢

Paint, and Electronic Arts' Studio/8, you are confronted with a dizzying assortment of palettes, tools, and effects. Assessing which package best suits your needs can be a real challenge.

All five paint programs incorporate some familiar features: brushes, pens, and paint cans; ovals and rectangles; opaque and transparent paint; smoothing; and gradient fills. All are 8-bit color programs offering access to 256 colors at any given time, out of a possible 16.7 million altogether. (A 24-bit color graphics application, LaserPaint Color II, from LaserWare, can display as many colors as there are pixels on your monitor.)

Similarities aside, this article will focus on the features—good and bad—that set individual programs apart. Besides looking at unique capabilities, such as color separation and 3-D shading, I'll gauge the overall performance, organization of tools and effects, and ease of learning and use for each program (see "Color Paint Comparison" for a summary of the findings).

GRAPHISTPAINT II

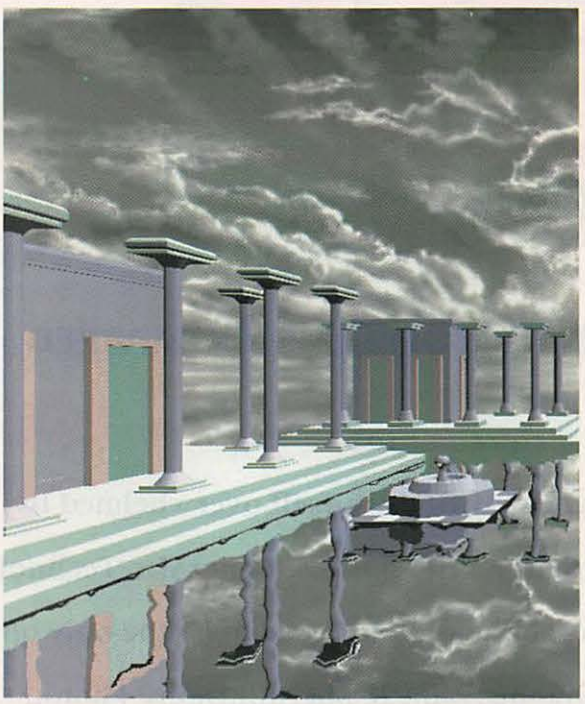
Any program that has a feature called smart incrustation can't be all bad. Unfortunately, GraphistPaint II isn't all good, either. Although the program offers a respectable set of painting tools and effects, the documentation—rather literally translated from the French original—is daunting. The manual opens with an explanation of color theory that offers only passing glances at palette organization and color-wheel layout, quickly diving into an intimidating digest of the logical and arithmetical graphic modes employed by the program. And yet, when you finally pick up an electronic brush, you still have to experiment quite a bit to figure out how each mode interacts with the colors in use.

My all-time favorite graphics effect—the ability to transfer a selected area onto a sphere.

Although I was disappointed by the documentation, GraphistPaint II redeems itself somewhat with several impressive tools and effects. Menu items such as Shade, Blur, Smudge, Diffuse, Contour, and Dither give you the power to sharpen, smooth, or soften an image to achieve the look you want. Tools such as the anti-aliased brush and the water drop soften jagged edges. You can double-click on many of the tools to change their attributes. The spray can, when combined with the Smudge option, creates some wonderful textures that I was unable to duplicate with any of the other programs.

An integral feature of GraphistPaint II is the stencil, which acts like a supplementary work surface beneath the drawing layer. The stencil consists of all or part of another selected image. Using the paint bucket, geometric tools, and certain drawing tools, you can allow parts of the stenciled layer to show through, creating a montage effect. You can even specify that the stenciled image replace certain colors. In an odd turn of phrase, the stenciled image is said to be "incrusted" onto the document.

Although GraphistPaint II works well with scanned TIFF images, and features my all-time favorite graphics effect—the ability to transfer a selected area onto a sphere—its special features don't make up for its shortcomings. These range from occasional interface irregularities (you have to press Shift-Option to move a palette window, rather than simply dragging it, and you can't erase pixels with the pencil), to tool inadequacies (a sluggish brush), to bothersome peculiarities (the spray can sprays in a square and the drawing area doesn't scroll when a tool hits the edge). Although GraphistPaint II offers some powerful graphic effects, the combination of a mediocre manual and complex tools, modes, and layers makes the program difficult to learn. (For information on a soon-to-be-released GraphistPaint II upgrade, see "Shades of Things to Come.")



Waterscene, by Erik Wenger, illustrates GraphistPaint II's ability to combine and color scanned TIFF images. The reflections in the water were softened using the water drop tool.

COLOR PAINT COMPARISON

	GraphistPaint II	Modern Artist	Photon Paint	PixelPaint	Studio/8
Company	Aba Software	Computer Friends	Microllusions	SuperMac	Electronic Arts
Version	1.0	2.0	1.1	1.1	1.0
List price	$495	$495	$299	$395	$495
TOOLS					
Regular polygons				6	8
Smooth path		•			
Bezier curve					•
Fractal lines				•	
Adjust arc by apex					•
Any selection can be brush	•	•	•	via Clipboard	•
Create multicolor brush	•	•	•	via Clipboard	•
Adjust airbrush size	•	two sizes	•	•	•
Adjust airbrush shape			•	•	
Splatter cap for airbrush				•	
Mix fonts/sizes in text block		•	•		•
SELECTION CAPABILITIES					
Select specified colors			all but one; one only		•
Select from inside shape	•			•	•
Edit tools work with lasso	•		•		•
Levels of magnification	3, 4, 5, 7,10x	4, 7, 16x	4x and up	2, 4, 8x	2, 4, 5, 8x
COLOR					
Mix colors on screen		•			•
Palette colors displayed	256	92 plus 4 ranges	256	256	256
Variable dithering for gradients		•			•
Save color ranges	•	•	•		•
CYMK color editing		•			
MISCELLANEOUS FEATURES/ EFFECTS					
Masking	•		with Protect Colors		by shape/color
Transparent page	•				•
Visible grid		•	•		•
Open multiple documents			•		•
Screen autoscroll		optional			•
Wrap object onto shapes	sphere only		•		
Bend selection					•
Resize selection by percent	•		•		
Move drawing in Show Page	•	•		•	
Light source for 3-D shading		•			
Tile effect			for wrapped objects	•	
Sharpen, diffuse selection				•	
Online help		•		•	•
INPUT/OUTPUT					
Read*	1, 2, 3, 4, 6	1, 2, 5, 7	2	1, 2, 5	1, 2, 3
Save*	2, 3, 4	1, 2, 7	2	1, 2, 5, 8	2, 3
Create color separations		•		via utility	

**1 = Paint; 2 = PICT; 3 = TIFF; 4 = IRIS; 5 = EPS; 6 = PixelPaint; 7 = rPIC; 8 = Start-up screen.*

SHADES OF THINGS TO COME

Macintosh programs are generally works in progress. With stiff competition in almost every software category, programmers are often busy working on revisions before an application even hits dealers' shelves. Color paint programs are no exception. At the time I was writing this article, two of the programs reviewed were being revised.

PixelPaint 2.0 will add an impressive array of features to SuperMac's classic paint program. PixelPaint 2.0 addresses one of the problems that has long plagued color paint programs: output. A color-separation utility lets you print four-color separations on high-resolution PostScript imagesetters. In addition, the program incorporates Pantone Matching System (PMS) colors, a welcome addition to any graphics program.

PixelPaint 2.0 improves on its predecessor's ability to import files, too: a utility called PixelScan lets you open files created with 24-bit color scanners such as the Sharp JX-450 and Howtek's Scanmaster. Since PixelPaint 2.0 supports 8-bit images, imported 24-bit scanned images are converted to 8-bit color.

Last but not least, PixelPaint 2.0 includes masking in its repertoire of effects. PixelPaint 2.0's list price is $595; the program should be available by the time you read this.

GraphistPaint II is also being improved. Version 2.0 should run considerably faster than the first release, and it will incorporate distort and bend effects, a polygon selector, additional image-processing capabilities, and the ability to separate images into cyan, magenta, yellow, and black files.

The new version of GraphistPaint II will also allow users with some programming skill to add custom effects to the program.

No major changes are in the works for Studio/8, but an Electronic Arts representative says a forthcoming version will include a color-separation utility. In addition, a 32-bit version (called—you guessed it—Studio/32) is in the works, waiting for the appropriate video hardware to support it.

PHOTON PAINT

Like GraphistPaint II, Photon Paint offers a good set of basic tools and effects. Although it has the advantage of being able to open 24-bit color, the program suffers from a poorly designed user interface. For example, Photon Paint's tool and color palettes take up more screen real estate than the drawing area when you first open a document. The palettes can be moved or closed, but there's little excuse for devoting 15 toolbox icons to pen sizes instead of using a dialog box or tear-off menu. And there's no eraser icon! (There is a menu item for clearing the entire screen, however.)



Carnival Life was created by Louis Johnson using Photon Paint from Microllusions. Note the variety of textures and perspectives in the image.

In contrast to GraphistPaint II's manual, which launches right into subjects such as Bic and Xor graphics modes, Photon Paint's documentation errs on the side of simplicity, giving detailed descriptions of basic operations, such as pulling down a menu or closing a window. Such explanations are a courtesy to Mac neophytes, but they're annoying to anyone who has mastered standard Mac operating procedures. Worse yet, the manual has no illustrations, no index, and a lengthy addendum.

Photon Paint can wrap objects around various shapes: cylinder, cone, sphere, spheroid, cube, sides of a cube, or free-form shape, although this wrap effect isn't nearly as impressive as GraphistPaint II's Spherize effect. I encountered varying degrees of success. You can illuminate 3-D objects with a light source—if you can figure out the convoluted light-source dialog box. The program also lets you twist or bend objects by dragging their handles.

Other pluses include the program's Resize command, which enables you to type in a percentage to reduce or enlarge a selection. A visible grid is another nice touch. The Protect Colors option lets you mask selected colors, but that command slows the operation of the pen tool. Add, subtract, blend, and wash modes all enable you to determine the ways in which colors interact with one another.

Although it offers most of the drawing tools you'd

expect from a paint program, Photon Paint deviates from such Mac conventions as double-clicking on a tool icon to modify the tool. The program also lacks some old standards—the grabber, the pencil, and the eraser—and its airbrush moves in jerky spurts. Even though it's cheaper than the other programs reviewed, I hesitate to recommend Photon Paint.

Studio/8

While I was less than impressed with Photon Paint, I was delighted with Studio/8 from the moment I started painting. The program packs a lot of tools and special effects into a well-designed interface, and the documentation is clearly written, well organized, and full of illustrations and examples (for more information see *Reviews*, March 1989).

Studio/8's tools are divided into three types: basic tools, tool modifiers, and selectors. In addition to the basic pencil and paintbrush tools, Studio/8 offers a regular polygon (with up to ten sides), a bezier-curve tool, and an ellipse that you can rotate to any angle as you draw. You can make any selected area into a brush and save custom brushes for later use. Tool modifiers affect the operation of the basic tools; for example, they let you constrain movement to a grid or include colors from a selection.

Of the five programs examined here, Studio/8 offers by far the best set of selection tools. The selection rectangle, lasso, and polygon selector can surround an object and the adjacent background, shrink to surround just the object, expand to fill an object from the inside, or even surround only specified colors within a selected area.

Another of Studio/8's specialties is masking. Areas can be masked by shape or color, and then paint can be either applied to or excluded from masked areas. You can turn masks on and off or clear them altogether when you're done with them. In addition to masking, Studio/8 lets you place a "transparent page" over your painting, allowing you to try out new ideas and discard them if you don't like them.

Although Studio/8 doesn't automatically wrap objects around shapes as GraphistPaint II and Photon Paint do, it does let you select an object and bend or twist it by dragging one or more handles. You can also select a command that gives the illusion of perspective, in order to create a plane that seems to recede into the distance.

You can tune Studio/8's color palette by adjusting the red-green-blue (RGB) or hue-saturation-brightness (HSB) values with the program's custom dialog box or Apple's Color Picker, or by mixing colors on the screen as if you were blending oils on a palette.



Dancing Fool, a multihued image by Trici Venola, takes full advantage of Studio/8's palette. Smoothing effects and gradient fills tease the colors into shape.

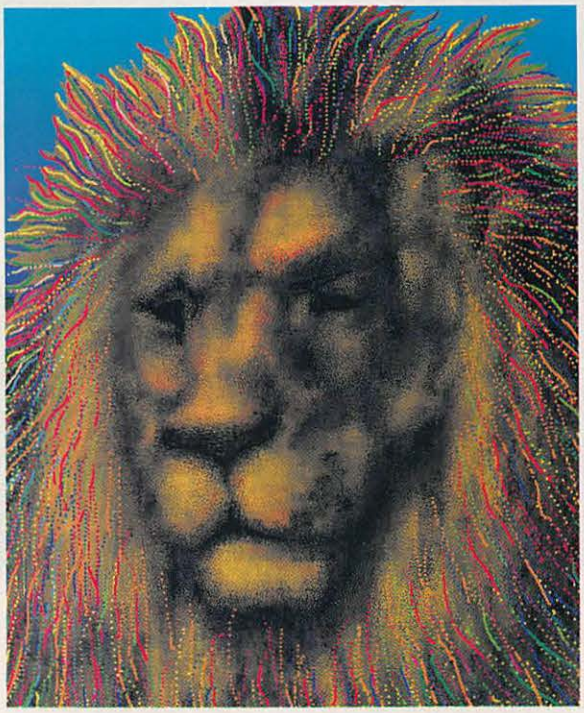
My main complaint about Studio/8 is that it offers *too many* features. What kind of a complaint is that? It's a valid one if you're looking for a paint program that you can master in a few hours. If you just want to pound out some color charts or slides, you might not want to invest the time it takes to learn how to use Studio/8. The program comes with a 300-page, hardbound book of instructions. On the plus side, the instruction book is well organized and if you don't need all of the program's many offerings, you can concentrate on individual features.

My other complaint is that Studio/8 is a disk-space hog. The manual suggests that you set aside at least 6MB on your hard disk for Studio/8. I don't know about you, but I don't have that much room to spare. Fortunately, you won't need all that space unless you copy the entire contents of the five Studio/8 disks: the program, brushes, textures, fonts, sample artwork, a screen-capture utility, and a slide-show utility. But you still must keep more than 2MB of disk space free (in addition to the 690K taken up by the program) to run Studio/8.

After complaining about the overabundance of options, it's perhaps strange to long for any additional features, but I wouldn't mind 3-D shading with a light source and the ability to draw patterned lines. Oh yes, and faster printing wouldn't hurt either.

PixelPaint

PixelPaint was my first love, paint program–wise. But PixelPaint has gone the way of all too many first loves. My heart has been stolen by Studio/8. Nevertheless, I'm still impressed with PixelPaint's clean, simple interface. It's the easiest of the five programs to learn and use, which counts for a lot in my book.



Colorlion, *by Keith Ohlfs. The artist used PixelPaint to create a riot of bright colors superimposed over muted golds in the big cat's mane.*

In addition, the program's manual is clearly written and well organized. PixelPaint's drawing tools are similar to those of MacPaint or SuperPaint, allowing anyone who's familiar with one of these classics to start painting right away. You can switch from the normal tools to a special-effects palette with the click of a button, and in special-effects mode, each tool has its own Options menu. The Brush menu, for example, has 16 options, from Smoothing, to Wash, Tint, and Color cycling.

PixelPaint makes it easy to set gradient fills—you simply select a starting color and an ending color, and the program fills in the intermediate colors in the current palette. PixelPaint's adjustable airbrush includes one of my favorite painting tools—a spatter cap. PixelPaint is the only color paint program to offer this clever option.

However, PixelPaint has its shortcomings: it lacks a masking feature, the drawing area doesn't scroll when a tool reaches the edge of the window, and you can open only one document at a time. And PixelPaint's text handling is disappointing compared to that of Studio/8 or Modern Artist. You can't mix fonts and styles, or resize a text block as you type.

All in all, PixelPaint's clear documentation and careful adherence to Mac interface standards make it delightfully easy to use. Although the current version lacks some of the glitzier options, it is ideal for most simple graphics tasks; and when SuperMac releases PixelPaint 2.0, the competition may have to watch out (see "Shades of Things to Come").



Sailing Ship *was created in Modern Artist's Expert Color mode by Ben Adams. To separate the colors for reproduction, the image was saved in PICT2 format and the subtle gradients of the Expert mode were replaced by banding.*

Modern Artist

When I first looked at Modern Artist about a year ago, I adopted a somewhat ho-hum attitude, having been swept off my feet by PixelPaint at the time. But looking at Modern Artist 2.0 in the context of the five programs reviewed here, it comes across as a good, solid program. Modern Artist lacks the razzle-dazzle of PixelPaint or Studio/8, but it offers a well-stocked tool palette, and even a few unique effects.

For example, Modern Artist's 3-D tool lets you create spheres that you can illuminate with a movable light source. The program's Freehand Curves option smooths curves as you draw, softening the inevitable irregularities in curves drawn by hand. Modern Artist offers an elegant way to create smooth gradient fills—the program automatically creates a smooth blend between the source color and the destination color, rather than filling the blend with the intervening colors in the current palette the way most other programs do. Multicolor brushes are another specialty; you can select colors from the palette and create a custom brush of many hues. Like Studio/8, Modern Artist can mix fonts, sizes, and styles; resize a block of text; and blend colors on screen as though mixing paints.

Unlike the other programs, Modern Artist offers two color modes: standard colors and expert colors. Standard mode uses Apple's standard color table, enabling you to retain a painting's colors if it's pasted into another document or application. If you don't want to be constrained by Apple's default colors, Modern Artist's expert color mode lets you customize the color palette.

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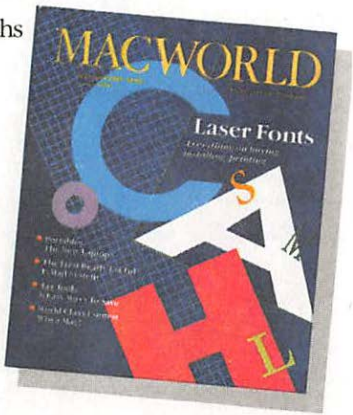
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MACWORLD

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At the time I wrote this article, Modern Artist was the only color paint program to include a color-separation utility. (Color-separation modules are reportedly under way for PixelPaint 2.0 and for Studio/8.) The utility converts a painting to four files: cyan, magenta, yellow, and black (CMYK). Options include adjustable screen angles, image enhancement, color correction, and scaling.

Like the others, Modern Artist has its shortcomings. My biggest complaint is that the program displays only 92 colors in its palette, as opposed to the 256 offered by the other programs. Although the spray can sprays in two colors at once, the spray comes in only two sizes. And while Modern Artist's documentation isn't as poor as GraphistPaint's or Photon Paint's, it could stand to be enhanced.

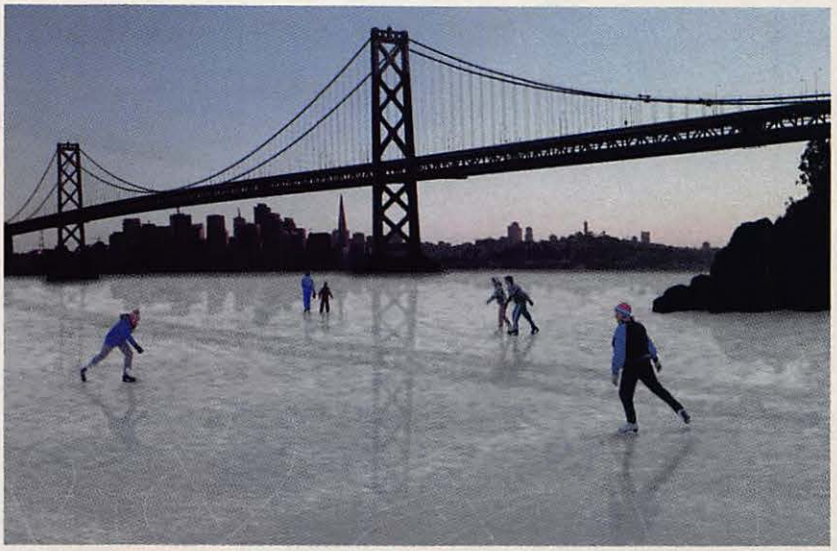
Output Alternatives

One final point that needs to be addressed is output. Traditional painters have never faced this problem—the painting is the output. But most digital artists must deal with the issue of transferring artwork from the screen to other media. Several output options exist, but the fact remains, the technology behind converting pixels to printed output is in its infancy.

The most straightforward method of printing color paint documents is to send them to a color thermal printer like the Tektronix 4693D, the Howtek Pixelmaster, the Shinko CHC-335, or the QMS ColorScript 100. All of the programs reviewed support thermal printers. Unfortunately, the output from these devices is often less than satisfactory. Printed colors vary greatly from displayed colors, and the quality of most printouts doesn't meet the standards of graphics professionals.

Your best bet is to make a slide of your color graphic with a film recorder such as the Mirus FilmPrinter. Again, documents from any of these five programs can be sent to a film recorder that supports bitmapped images.

Yet another alternative is to create a color separation. Until recently, the only way to separate a color paint file into its cyan, magenta, yellow, and black components was to save it as a color PICT file, transfer it into LaserWare's LaserPaint Color II, and employ that program's color-separation utility. However, the latest version of Modern Artist includes a color-separation module, and PixelPaint 2.0 will include one as well. According to an Electronic Arts representative, a color-separation utility is in the works for Studio/8. Advanced color separation techniques may prove to be the catalyst that allows color paint programs to graduate from luxury programs to essential components in the Mac publisher's toolbox. (For more information on color separation, see "Color Separation Explained" in *Macworld*, February 1989, and "Selecting a Color Separator" in the March 1989 issue.)



While the ice and reflection of the San Francisco–Oakland Bay Bridge in Skaters look as real as the scanned images of the bridge and ice skaters, they were actually created by artist John Derry using Lumena, a 32-bit true-color paint package from Time Arts. Available in the PC environment for the past seven years, Lumena will be released to Macintosh II users as soon as Apple begins shipping its QuickDraw graphics software for 32-bit videographics boards this spring.

Colorful Conclusions

If you're looking for a paint program that's easy to learn, I'd suggest PixelPaint or, perhaps, Modern Artist. Although Modern Artist lacks PixelPaint's elegant interface and excellent manual, as well as special effects such as Sharpen or Diffuse, Modern Artist offers superior text handling and unique effects such as 3-D cubes and spheres. GraphistPaint II offers a wide selection of tools and effects, but I found it relatively difficult to learn and not as versatile as Studio/8. Lastly, Photon Paint is competent enough, but even with a price tag $200 less than its competitors, it doesn't quite measure up.

After working with all five color paint programs, I decided to give Studio/8 a home on my hard disk. This wonderful program includes all the basic tools a digital artist could want, as well as a wide array of special effects. You'll need to spend some time becoming familiar with the program's many features, but I found it well worth the effort. M

See *Where to Buy* for contact information.

At press time, Macworld was informed that Aba Software will no longer be distributing GraphistPaint II. The developer, Adone Systeme of France, pledges full support for its products and is seeking a new American distributor.—Ed.

Erfert Fenton, a contributing editor of Macworld, *has been writing about Macintosh graphics since the earliest days of the Mac.*



Sure winners, the lightweight, silent, and inexpensive Cirrus drives from La Cie come with first-rate utility software. Also check out the Liberty 80—at 2 by 5 by 7 inches, it's the smallest drive we tested; it's fast, quiet, and has strong utility software. The drive doesn't contain a fan; instead, heat flows to the metal case, making the drive hot to the touch.



PHOTOGRAPHS BY PAUL FRANZ MOORE

A GUIDE TO 80MB, 90MB, AND 100MB HARD DRIVES

by David Pogue

MASSIVE MEDIA

Buying a hard drive, it has been said, is like buying a box of detergent: the bigger the size, the better the value. It's also been said that megabytes are like money and power—no matter how much you've got, pretty soon you'll need more.

If you're in the market for a hard drive, that's reason enough to think big—along the lines of 80MB or 100MB, in fact. The first 10MB drive advertised for the Mac cost $1600—that's $160 per megabyte. But in four years, the cost of fast, instantly available mass storage has dropped by 90 percent; today's list price for a 100MB hard drive, for example, can go as low as $12 per megabyte.

And big hard drives aren't just a better value than smaller drives; they're also faster. Large-capacity drives are constructed of more expensive, better quality media and heads than, say, 20MB drives. They also contain sophisticated electronics that decrease the average seek time—the amount of time it takes to find a particular piece of data—by packing data more tightly on the media, so that the heads don't have to travel as far to access the next piece of information. Drives in the 20MB to 30MB range, on the other hand, are designed to be inexpensive, and they lack these speed enhancements.

One of the best features of big hard drives is that they're not really big; in fact, they're no larger physically than their 20MB counterparts. Inside any hard drive,



Good buys include MicroNet's MS-91, which provides solid operation at a midrange price; Mirror's strong, fast Shadow 80; the quiet, smooth MacinStor 90 ZFP from Storage Dimensions; Ruby Systems' StarDrive 90, which wails like a banshee on start-up but is silent and stable when running; and Microtech's Nova 80, which has a five-year warranty and is the fastest, least expensive drive.



Middle-of-the-road drives include Open Mac's average-priced and average-performing OME100X and CMS's silent, sure MacStack SD81U.

you'll find thin metal platters spinning at 3600 revolutions per minute; depending on the model, these platters are either the newer, quicker 3½-inch diameter platters or the older 5¼-inch ones. To make a large-capacity drive, a manufacturer simply stacks three or four of these platters closely together; usually, 80MB or 100MB worth of spinning platters fit into the same case that would house 20MB. In other words, you don't give up desk space to gain disk space.

Deciding that 80MB or 100MB is the right size drive, though, is the easy part. Choosing from among the dozens available will take a little more research. To help you decide, here's a *Macworld* buyers' guide to the massive media.

In, Under, or Beside

First you have to decide where you want the new hard drive to go. There are some compelling arguments for an internal hard drive, such as sheer convenience: there's nothing to plug in, nothing to switch on, nothing extra to pack when you transport the Mac. Most internal drives are slightly less expensive than external drives.

But an internal drive must be installed—a process not for the technically weak at heart, especially on the SE (in fact, you may need to have the dealer install the drive in order not to void your warranty and to avoid the danger of working with high-voltage components). If your SE has two floppy drives, you'll have to remove one to make room for the hard drive (although some, like those from La Cie, Jasmine, or CMS, are designed to coexist with both floppy drives). Furthermore, if either the internal drive or the Mac needs repair, you lose the use of your entire Macintosh setup while it's being serviced. With an external drive, however, the Mac is still usable if the drive goes on the fritz, and vice versa. An external hard drive is also handy if you work with more than one Macintosh—just pack up the drive, hook it up to any Mac, and you've instantly transported your entire system.

If you sell your current Mac to purchase a newer model, you can plug your old drive into the new computer, thus prolonging the value of your investment. That may not be feasible with an internal drive. (Jasmine's InnerDrive 100 manual, for example, warns that once you've installed the drive, you can never remove its power cable from inside the Macintosh.)

Driving at High Speeds

A drive's speed should also influence your decision. On paper, the differences in speed from one unit to another are small—the average seek time of a drive (one of several important statistics for comparison) is measured in milliseconds. Yet during disk-intensive activities like starting up or launching a program, the fastest drives, like Microtech's Nova 80, have a several-second advantage over the slower ones, like the Macintosh Hard Disk 80SC from Apple (see "Real-World Test Results for Mac II" and Real-World Test Results for SE"). A fast hard drive can be glorious to use; Finder windows seem to pop open instantly, and duplicating small files can be almost immediate.

Speed can also depend on which OEM (Original Equipment Manufacturer) produces the drive. Most hard drive companies are actually integrators who buy the drive mechanism from one of a handful of OEMs and then assemble, package, and market the finished machine. The OEM for 80MB drives from La Cie, Mirror, Everex, Liberty, Warp Nine, and Microtech, for example, is Quantum; inside the 80-meggers from Relax and Crate you'll find Seagate drives; Ruby, FWB, Relax, and Giga Cell use the 91MB mechanism from CDC; and Rodime provides the innards for Jasmine, Open Mac, Peripheral Land, and of course, its own Rodime-label drives. Other OEMs include Conners (in the Cirrus 100), Maxtor (in the Cirrus 90 and MacinStor 90 ZFP), and Priam (only in Priam drives).

On paper, speed differences are small. In reality, the fastest drives have a several-second advantage.

One integrator, CMS, offers a choice of drives made by different OEMs within the same capacity range. They sell two lines of drives: the MacStack (80MB from Seagate; 100MB from Rodime) and the more expensive Platinum Series (80MB from Quantum; 100MB from Conners). All of these drives are available in several configurations: external, internal for Mac IIs and single-floppy SEs, or internal for double-floppy SEs.

The Quantum-based drives are generally the fastest, with the Conners a close second. Six of the top ten finishers in our real-world speed tests on a Mac II con-

TESTING THE DRIVES

The *Macworld* lab benchmarks used measure both the low-level and the real-world performance of the hard drives. For the low-level tests we used SCSI Evaluator, a shareware utility by Digital Microware that measures average seek time. The real-world applications included importing text to HyperCard, opening an Excel document, duplicating folders with files of various sizes, and copying files to memory. The following benchmarks were also run: loading a MacDraw II document, saving a 20K Microsoft Word file, and exporting text from HyperCard. However, those results don't appear in the charts since the time differences between drives were barely noticeable.

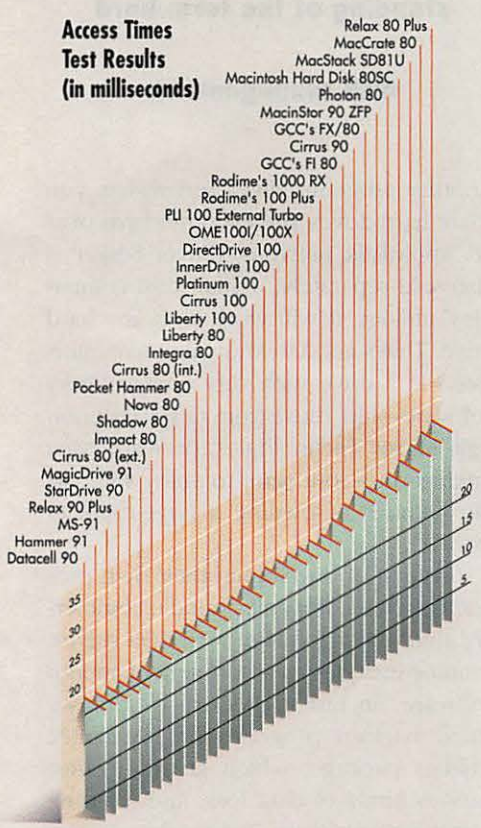
Before running the tests, we reformatted the drives to achieve optimum performance for the CPU used. The benchmarks were then loaded onto the drives together with System 6.0.2 in minimum configuration. The Control Panel's RAM Cache, MultiFinder, AppleTalk, and other background operations were disabled, since their activities would distort the test results. We ran each benchmark three times to minimize any human error in timing.

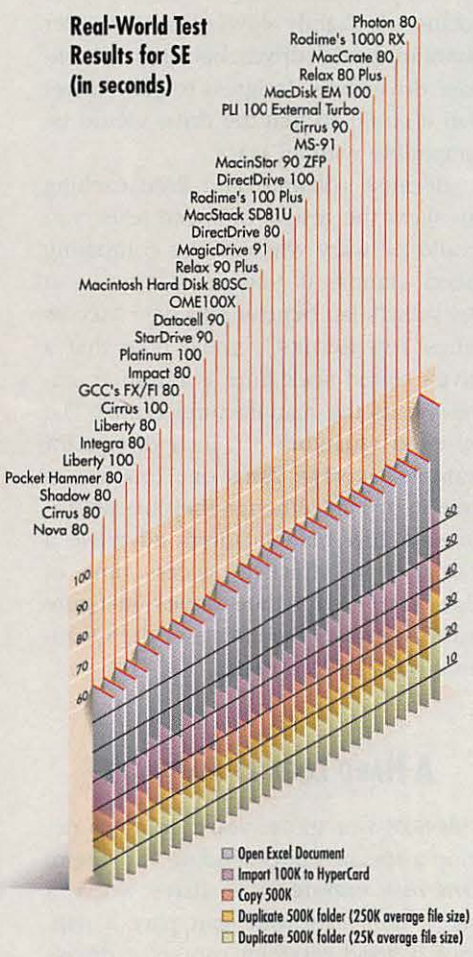
How Reliable Are Access Times?

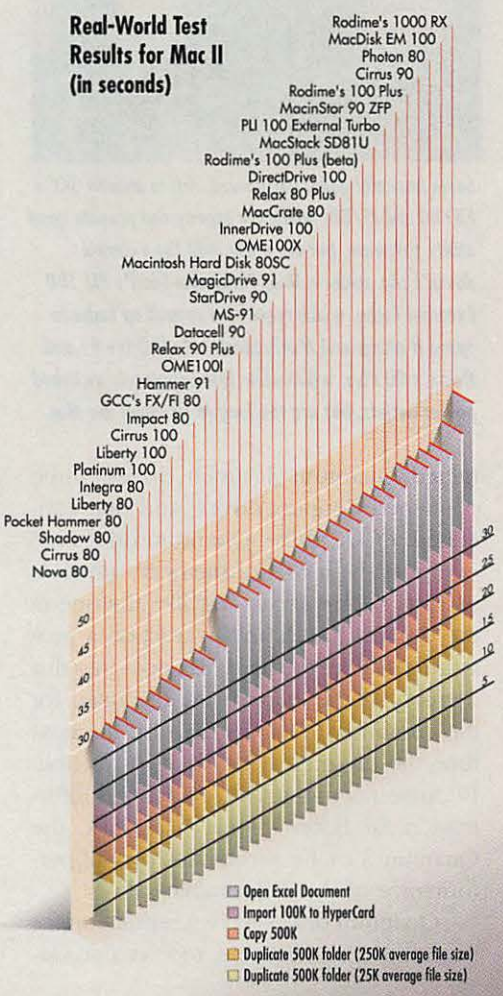
The fastest drives in our access times test are not the same as the fastest drives in the real-world tests. Tests that measure average access time show the raw power of the drive; they don't take into account the variety of ways applications can be optimized to find information on a disk. The results of the real-world tests are a better reflection of how a drive will perform in a real working situation than are such things as a company's claimed access time.

Speed Rankings in the Real World

In the real-world tests for the SE and the Mac II, the drives fall into distinct groups based on speed. The first 10 or 11 drives are much faster than the next 20 or so. The top 11 drives in the Mac II tests are the same as the top 11 drives in the SE tests—and the rankings for the first 4 drives are identical in both tests. The rankings of the slower drives were not as consistent between the two tests, but the speed difference between the fastest and slowest of these midrange drives is barely perceptible, either in the graph or in real usage. The drives that were ranked last, however, are noticeably slower than the others.









Fine, but expensive, drives include FWB's compact, fast Pocket Hammer 80; Dolphin's solid Integra 80; the quick, sturdy Datacell 90 from Giga Cell; the ultra-quiet, compact, speedy Impact 80 from Everex; and the low-profile, fast CMS Platinum series 100MB drive.



Some basically good, but flawed, drives include GCC's FX/80 and FI/80, which are speedy and provide good utility software, but are noisy, and the external doesn't slip under a Mac; Peripheral Land's PLI 100 External Turbo, which requires a souped up cache to speed it along; and MacProducts' MagicDrive 91 and Relax's 90 Plus, which offer four separately switched power outlets, but are too long to sit under the Mac.

tained Quantum 3½-inch drives; three contained Conners drives; and one contained a CDC drive. Quantum drives are equipped with 64K of memory, which is used as a RAM cache, just like the one in the Control Panel: any instruction a program gets from the hard disk goes into this memory cache, eliminating the need for the computer to access the disk the next time the program needs that instruction. Because a computer's RAM delivers information far faster than a hard disk, the Quantum's cache accelerates overall performance of the disk dramatically.

Quantum drives have a reputation for being quiet and reliable, too; as a consequence, the Quantum drives (whose 80MB mechanism is the only one that fits the scope of this review) tend to be more expensive than others. For example, La Cie's 90MB drive costs exactly the same as its 80MB drive; the 90MB drive has a better price per megabyte simply because it's not a Quantum drive and is slower.

Tricks up the Sleeve

In some cases, a drive's speed can be affected by its software. Peripheral Land drives, for example, benefit from a software trick called the Turbo Cache. The Turbo Cache is little more than a refined, more elegant version of the Apple RAM Cache, and it can achieve the same dramatic speed increases—if your Mac has enough memory. On a 1MB Mac, you can't set the cache large enough to make a visible difference.

Software can also affect a drive's speed adversely; Everex's Impact 80 drive, for instance, is slightly slower than the other Quantum-based drives because its software driver was designed to run slower than it could so that the drive would be compatible with all Macs.

Because software and RAM caching can skew the results of speed tests, you should be wary when you're comparing speed claims; if you look closely at *Macworld*'s lab benchmarks (see "Access Times Test Results"), you'll note that a drive's tested seek time is rarely as impressive as the manufacturer claims. The top-rated Quantum 3½-inch drives, for example, average 21ms or 22ms access times in real life although they are rated at 19ms. A few manufacturers advertise a potential or "effective" access time of 12ms to 16ms for their drives—a figure that exaggerates the effects of the Quantum's built-in RAM cache.

A Hard Look at Software

With 80MB or more, you'll come to develop a special understanding of the term *hard disk management;* that's where a drive's utility software can play a part. Since a good program can set a drive's interleave ratio, as well as defragment and partition a drive, management software is also a significant factor in a drive's speed. (For more on interleave and partitioning, see "Twenty Megabytes and Spinning," *Macworld,* December 1988.)

Good software can make using a hard disk a joy. La Cie's Cirrus drives, for instance, include an outstanding set of utilities: Silver Lining performs hard-disk management tasks like formatting, setting interleave, and partitioning; a desk accessory allows you to mount, unmount, and even create partitioned volumes as you need them. Silver Lining is so flexible it can treat several daisy-chained hard drives as a single vast volume.

With 80MB or more, you'll develop a special understanding of the term hard disk management.

Another program, Silver Server, lets you share hard drives and even modems over an AppleTalk network. (Silver Server is also sold separately; unlike most companies' utilities, it will work with any hard drive. That's good to know if you're interested in a drive with very limited utility software—like those from Crate Technology, Mirror Technologies, or Warp Nine Engineering—but want to enjoy some of the luxuries of owning a large-capacity drive.)

Instead of developing their own programs, some companies bundle commercial third-party software with their drives. Jasmine includes an assortment of superb software, including Redux, a sophisticated backup program; the Symantec Utilities package, which guards against various kinds of data loss; and a strong partitioning program. Rodime drives come with Fastback (a speedy backup program) and Suitcase II; Storage Dimensions bundles PC Tools for the Mac with its MacinStor drives.

The Sound and the Fury

Macworld's sound tests show that most drives fall in the 40-to-50-decibel range—much lower than the sound in an average office (see "Noise Test Results"). Some drives such as La Cie's Cirrus series, the Liberty 80, and Everex's Impact 80 fall slightly outside the range, on the low side. Others such as Rodime's 100 Plus and the Relax 90 Plus fall on the high side. Still others such as Jasmine's DirectDrive 100 have an average decibel rating, but produce an irritating pitch that cannot easily be measured.

Then there's the strange case of the StarDrive 90: for the first ten seconds after you switch it on, you hear a zooming whine that increases in pitch, volume, and intensity until you think the drive is going to explode; then, abruptly, the drive is utterly silent, and it remains so until the next time you power up.

In Good Shape

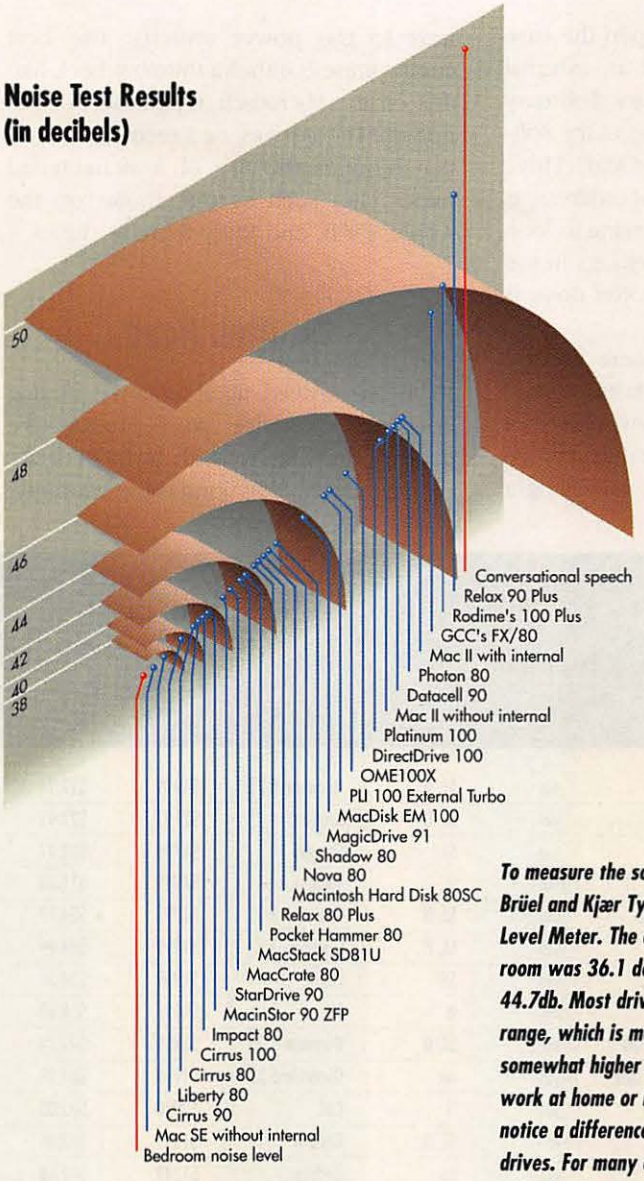
There's no benchmark test for hardware design, but the elegance and convenience of a drive—an external one in particular—should concern you. Different drives fit into a system with different degrees of elegance; the length of the cable, the design of the SCSI address control, and the shape and size of the drive should play a major role in your decision.

The majority of external drives are, like Apple's, simple boxes, colored to match the Mac and shaped to sit underneath it. To compensate for the stark rigidity of most metal-cased drives, a number of companies equip their drives with an attractive plastic front panel, colored and molded to match the Mac; when the Mac sits atop the drive, the panel is all you see. The Ruby Systems, Storage Dimensions, and MicroNet drives, among others, have adopted this look.

The design of GCC's FX/80 is awkward. Although it's one of the sturdiest drives on the market, it won't go under the Mac, and it won't fit neatly beside it either. The portable Cirrus drives from La Cie, the compact Pocket Hammer 80, and the microscopic Liberty 80 also won't go under the Mac, but they're small enough to be unobtrusive wherever you put them. In fact, at 4½ pounds for even the 100MB model, a Cirrus drive is light and compact enough to slip into its shoulder-strapped carrying case—a feat that would be difficult with, for instance, the gargantuan 13-pound MacDisk EM 100 drive from Priam.

Some external drives come with a power outlet on the back panel, where you can plug in a printer or a Mac, thereby eliminating an extra step in the power-up process. The Relax 90 Plus and the identically designed MacProducts MagicDrive 91 even offer four power outlets on the back panel, each with a separate on/off switch. These illuminated power switches—including the switch for the drive itself—are on the front panel of the drive, not the back; with the exception of the Impact 80, these two are the only drives you can switch on without having to reach to the back. Unfortunately, this power-cord elegance adds several inches to the length of the unit, making it jut out beyond the bottom of the Mac if you place the computer on top.

Speaking of the back panel, notice the accessibility of the SCSI address control. If you plan to daisy-chain several SCSI devices, each external device must have a unique SCSI number between 0 and 6. Changing an external drive's address may not be easy. To get at the Cirrus jumpers,



To measure the sound level of each drive, we used the Brüel and Kjær Type 2231 Modular Precision Sound Level Meter. The average ambient noise in our testing room was 36.1 decibels. Average drive noise was 44.7db. Most drives fall within the 40db to 50db range, which is much lower than a typical office and somewhat higher than the silence of a bedroom. If you work at home or in an unusually quiet office, you may notice a difference in the loudest and the quietest drives. For many office situations, however, a drive's noise level may not be a consideration. Still, watch out for drives that produce high pitches or whines.

for example, you have to open the case (the company plans to add an external control on drives made after February 1989). Having to boot up the utility software for the GCC drives or the MagicDrive 91 just to change the SCSI address is equally inconvenient. And having to look up the correct DIP switch settings in the manual for the CMS or MicroNet drive is unnecessarily complicated.

At the other extreme, there are the push buttons of the Priam, Jasmine, and Mirror drives, which are convenient but prone to accidental bumps, which can be disastrous (the push button is usually right next to the power switch). The best compromise is either a thumb wheel, like that on the Microtech, Open Mac, or Peripheral Land drives, or a recessed button that requires the use of a straightened paper clip, such as that found on the Apple, FWB, and Ruby Systems drives.

The Drive Home

If you've arrived at a tentative buying decision, compare your prospective choice's vital statistics with the other drives on the market. How long is the warranty? (The clear winner is Microtech's Nova 80, with a luxurious 5-year warranty.) What's the cost—and the cost per megabyte? (Winner: La Cie's Cirrus 100, at $9.49 per megabyte; Losers: Impact 80 and FX/80, at $24.99.) And finally, the most elusive benchmark: how well will the drive work with your system?

The cream of the 80MB crop includes the inexpensive Cirrus 80, the 5-year warrantied Nova 80, and the sleek Shadow 80. With real-life average seek times under 22ms, these quiet, strong Quantum-based drives ranked first in the timing tests, and are also among the least expensive. Both

MASSIVE DRIVES

	External	Internal	OEM	List price	Price per MB	Password protection software	Partitioning software	Partition management DA software	Backup software
Apple's Macintosh Hard Disk 80SC	yes	SE, II	Quantum 5.25	$1699	$21.24	no	yes	no	HD Backup
CMS Enhancements' Platinum 100	yes	SE, II	Conners	$2195	$21.95	no	no	no	HD Backup
CMS Enhancements' MacStack SD81U	yes	SE	Seagate	$1795	$22.44	no	no	no	HD Backup
Crate Technology's MacCrate 80	yes	II	Seagate	$1949	$11.86	no	no	no	HD Backup
Dolphin Systems Technology's Integra 80	yes	SE, II	Quantum 3.5	$1995	$24.19	no	yes	no	HD Backup
Everex Systems' Impact 80	yes	SE, II	Quantum 3.5	$1999	$24.99	yes	yes	no	HD Backup
FWB's Pocket Hammer 80	yes	SE	CDC	$1949	$24.36	yes	yes	yes	no
FWB's Hammer 91	no	II	CDC	$1695	$18.63	yes	yes	yes	no
GCC Technologies' FI/80 Internal Hard Disk	no	SE, II	Quantum 5.25	$1899	$23.74	yes	no	no	backup
GCC Technologies' FX/80 External Hard Disk	yes	no	Quantum 5.25	$1999	$24.99	yes	no	no	backup
Giga Cell Systems' Datacell 90	yes	II	CDC	$2070	$23.00	yes	yes	yes	HD Backup
Jasmine Technologies' InnerDrive 100	no	SE, II	Rodime	$1349	$13.49	yes	yes	yes	Redux
Jasmine Technologies' DirectDrive 100	yes	no	Rodime	$1249	$12.49	yes	yes	yes	Redux
La Cie's Cirrus 80	yes	SE, II	Quantum 3.5	$999	$12.49	yes	yes	yes	HD Backup
La Cie's Cirrus 100	yes	SE, II	Conners	$1999	$9.99	yes	yes	yes	HD Backup
La Cie's Cirrus 90	yes	no	Maxtor	$1099	$12.21	yes	yes	yes	HD Backup
Liberty Systems' Liberty 80	yes	no	Quantum 3.5	$1099	$13.73	yes	yes	yes	no
Liberty Systems' Liberty 100	yes	no	Conners	$1099	$10.99	yes	yes	yes	no
MacProducts USA's MagicDrive 91	yes	SE, II	CDC	$1299	$15.54	no	no	no	HD Backup
MicroNet Technology's MS-91	yes	no	CDC	$1695	$18.63	no	no	no	HD Backup
Microtech International's Nova 80	yes	SE, II	Quantum 3.5	$1039	$12.99	no	no	no	DS Backup
Mirror Technologies' Shadow 80	yes	SE, II	Quantum 3.5	$1299	$16.24	no	no	no	HD Backup
Open Mac Enterprises' OME100X	yes	II	Rodime	$1499	$14.99	no	yes	no	no
Peripheral Land's PLI 100 External Turbo	yes	no	Rodime	$2095	$20.95	no	yes	yes	HD Backup
Priam's MacDisk EM100	yes	no	Priam 5.25	$1850	$17.96	no	no	no	HD Backup
Relax Technology's Relax 90 Plus	yes	SE, II	CDC	$1645	$18.28	no	no	no	Relax & Save
Relax Technology's Relax 80 Plus	yes	SE, II	Seagate	$1495	$18.69	no	no	no	Relax & Save
Rodime's 1000 RX	no	SE, II	Rodime	$2195	$21.95	no	yes	no	Fastback
Rodime's 100 Plus	yes	no	Rodime	$2295	$22.95	no	yes	no	Fastback
Ruby Systems' Star Drive 90	yes	SE, II	CDC	$1647	$18.30	yes	yes	no	HD Backup
Storage Dimensions' MacinStor 90 ZFP	yes	SE, II	Maxtor	$1849	$20.54	no	yes	no	PC Backup

** The SCSI Evaluator program does not work with older drives (such as Priam's MacDisk) that do not support thefull set of SCSI commands.*

the Cirrus 80 and the Liberty 80 are perfect candidates if you plan to transport your drive; they're small and light enough to tuck into a briefcase, and they don't contribute to peripheral clutter on your desk. Of the 90MB and 100MB drives, you can't go wrong with the MicroNet, Storage Dimensions, MacProducts, or Ruby Systems drives, which are all quick, sturdy, and inexpensive.

GCC, FWB, Peripheral Land, Dolphin, Everex, and Giga Cell drives, as well as the CMS Platinum series, are fine drives, but they're much more expensive than most, hitting $2000 or more (the street prices, of course, may be lower than the list prices given here). If you want to avoid disappointment, skip the mediocre Photon 80 from Warp Nine, the ponderous Priam MacDisk EM 100, and the ordinary 80SC from Apple.You should also pass by the sluggish and noisy Jasmine DirectDrive 100, as well as the slow Rodime 100MB drives.

No matter which drive you select, there's no question that having 80MB or 100MB of hard disk storage under, inside, or next to your Mac can give you a giddy feeling. Without the hassle of finding and managing floppy disks, and free from the low ceiling of 20MB drives, your work on the Mac is more natural and requires less effort. Your entire computer world is online and available to you at all times.

The economics are good, too: for about twice the cost of a 20MB drive, you can have five times as much fast, quiet, reliable storage. That's enough to hold three sets of the *World Book Encyclopedia*, the next 120 issues of *Macworld*—or a few files of your own. ■



The drives we don't recommend are Crate's chunky MacCrate 80 with its inadequate utility software; the large, slow, expensive MacDisk 100 from Priam; the unspectacular Macintosh Hard Disk 80SC; Warp Nine's slow Photon 80, with its poor utility software; Jasmine's slow DirectDrive 100, which doesn't use the fast, quiet Quantum drive that made the discontinued DirectDrive 80 popular; and the slow, noisy, and expensive Rodime 100 Plus and 1000 RX.

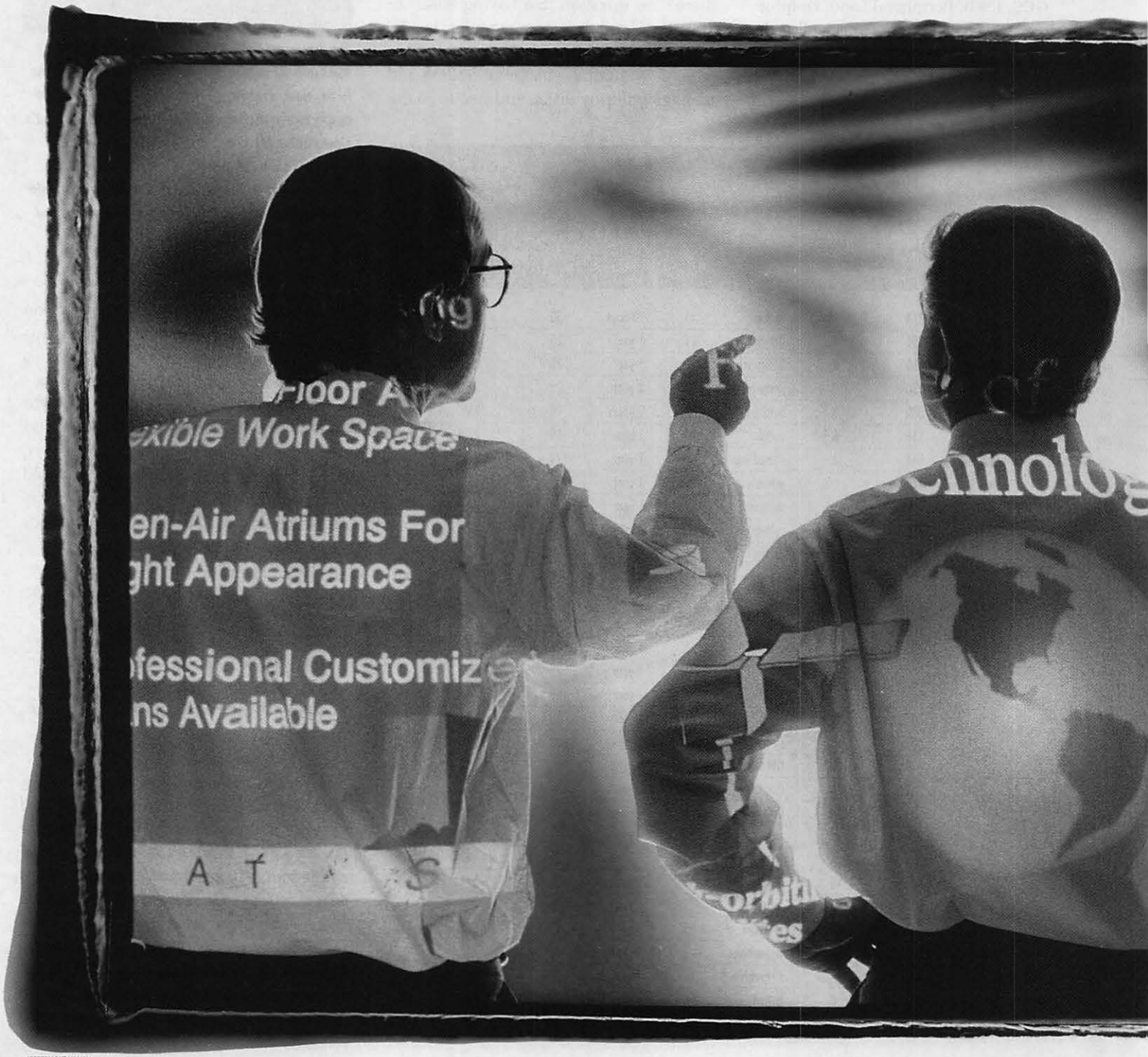
Manual Interleave setting software	Cable length (feet)	Volume (cubic inches)	Weight (pounds)	SCSI address change	SCSI port pins	Warranty	Claimed seek time (ms)	Benchmark seek time (ms)
yes	3	274	9	Button	50	90 days	30	29
yes	3	250	7	DIP switch	25	1 year	25	24
yes	3	350	7	DIP switch	25	1 year	28	30
no	6	230	10	jumpers	25	2 years	28	31
yes	6	330	8	button	25	2 years	19	21
yes	2	158	6.5	button	50	1 year	19	21.3
yes	1.5	146	6	screwdriver	50	1 year	19	21.7
yes	n/a	n/a	n/a	preset	n/a	1 year	18	19
yes	n/a	n/a	n/a	software	n/a	1 year	26	27
yes	2.5	427	8.6	software	50	1 year	26	28
yes	1.5	238	9	button	50	1 year	18	19
yes	n/a	n/a	n/a	software	n/a	2 years	24	24
yes	2	249	6	button	50	2 years	24	24
yes	1	135	4.5	internal	25	1 year	18	21
yes	1	135	4.5	internal	25	1 year	26	24
yes	1	135	4.5	internal	25	1 year	25	28
no	1.5	70	2.7	button	50	1 year	19	22
no	1.5	70	3.1	pushwheel	25	1 year	19	23
no	6	355	14.5	software	50	1 year	16.5	19.3
no	3	399	9	DIP Switch	50	1 year	18	19
no	2	282	6	thumb wheel	50	5 years	19	21.7
yes	2	189	6.5	button	50	2 years	19	21.7
yes	3	226	8	screwdriver	50	1 year	28	24
only 1:1	2.5	226	7	screwdriver	50	1 year	28	24
no	1.5	449	13	button	50	1 year	28	*
no	6	355	12	software	25	1 year	18	19
no	6	355	12	software	25	1 year	28	31.3
yes	—	—	—	screwdriver	—	1 year	24	25
yes	2	307	7.5	screwdriver	50	1 year	24	24
yes	2	236	8	button	50	1 year	18	19
no	1.5	437	7.4	screwdriver	50	1 year	29	28

See *Where to Buy* for contact information.

David Pogue *is a writer, composer, and Broadway conductor in New York City. He's an avid member of the New York Mac Users' Group.*

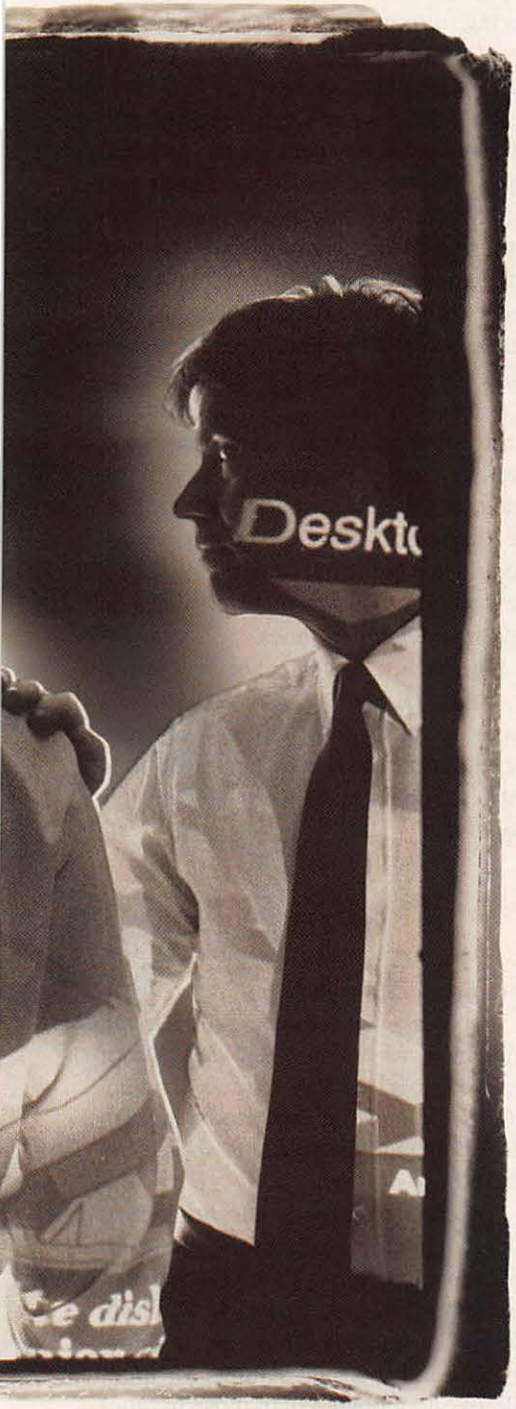
The hard disk market is volatile these days. For instance, in the short time between this article's completion and Macworld's print date, Apple switched from using the Quantum 5 1/4-inch drive to the 3 1/2-inch model and lowered the price; La Cie discontinued its Cirrus 90 drive and dropped the prices on its 80MB and 100MB models; and Warp Nine consolidated with its parent company, Mirror Technologies—contact Mirror about changes to the Warp Nine product line. PCPC introduced an 80MB Quantum MacBottom 3 1/2-inch drive. You should keep checking prices since they keep going down—we had to change the price listings frequently while producing this article—Ed.

PICKING



JEFFERY NEWBURY

THE BEST PRESENTER



by Phillip Robinson

Five presentation programs compared

You can create a presentation with just about any Macintosh application. Spreadsheets, word processors, drawing programs, and even database managers can be wrestled into laying down some graphics and text on a page. So who needs a presentation program?

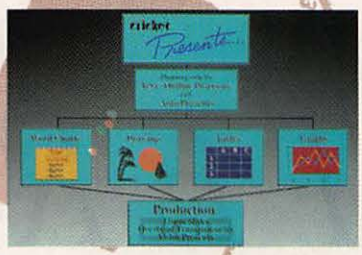
You could ask the same question about desktop publishing programs. Why not just use a word processor to format the text, and then paste in graphics? It would work, just not nearly as well as a dedicated application. Here's why: desktop publishing programs give you sophisticated control over how the text and graphics appear, and they let you accomplish all of your editing, positioning, and polishing work under a single structure. Likewise, presentation software brings all the steps together, enabling you to make presentations exactly the way you want them.

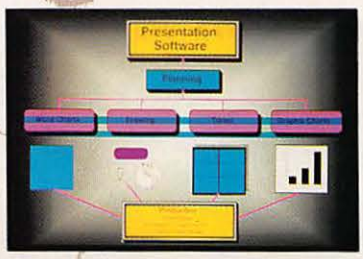
Originally there was only Microsoft's PowerPoint. Now a flood of products has emerged—PowerPoint 2.0, StandOut from Letraset USA, Cricket Presents 2.0 from Cricket Software, More II from Symantec, and Aldus Persuasion. Each handles parts of the presentation process better than the others do. All five programs run on monochrome or color Macs. In a monochrome system, patterns can be substituted for colors. Some output devices will later replace the patterns with colors.

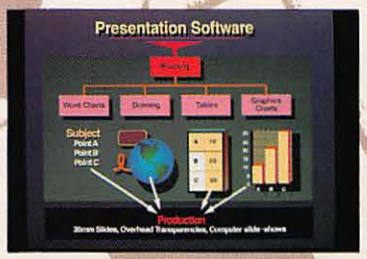
PLANNING

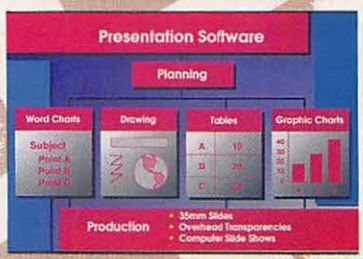
You should start your presentation by organizing your thoughts. An outline processor helps you group and regroup ideas. Each group of ideas can become a single frame in your presentation.

More II shines at outlining. The program automatically forms frames based on outlines you create in More II or import from a word processor. Each major heading in the outline becomes the headline of its own frame; each subheading or











The same slide was recreated in each presentation package in order to showcase the products' differences. In order from the top the slides were created in Cricket Presents, More II, Persuasion, PowerPoint, and StandOut.

section of body text beneath the heading becomes a line or section of that frame. Persuasion works almost exactly like More II with one major exception—any changes you make to text in frames are automatically made to the same text in the outline and vice versa. Only because Persuasion has fewer outline-manipulation commands does it place second after More II in outlining.

Cricket Presents 2.0 comes with Symmetry's desk accessory outliner, Acta, and a feature called AutoPresents that automatically applies Cricket Presents templates to Acta outlines. This combination does not offer the same tight integration that More II and Persuasion do, but it adds the freedom to create outlines while you're working in other applications. Acta's outlines can be pasted into Cricket Presents frames, one frame at a time or in a batch, and then edited using any of Cricket Presents' text commands. Because the Acta outline file is external to Cricket Presents, changes to the outline will not affect the frames: a distinct disadvantage compared to Persuasion's and More II's outliners.

PowerPoint 2.0 imports ThinkTank or More outline files (not More II files) and automatically assigns headings to frames. StandOut does not have an outliner at all; instead the program can read some word processing files into frames. I want an outliner in any presentation program I use, especially since none of the programs is smart enough to split a large block of text into two frames if it doesn't fit in one. In such cases, you ought to be able to go back to the outline to break up the text.

More II and Persuasion clearly provide the best outlining facilities; because of its use of the Acta DA and templates, however, Cricket Presents may be more flexible in starting an outline, if not in continuing one. PowerPoint can at least import an outline. StandOut is left out in the cold.

WORDS

More II is a master at text charts. Using its outlining features, More II can instantly transform an outline into a bullet chart or a tree chart. Like all of the programs, More II contains a search-and-replace feature for words and phrases.

StandOut offers the most sweeping and subtle text-formatting commands, including text shifting, line, word, and paragraph spacing, precise kerning, and other such minutia. Its search-and-replace function can find specific fonts as well as characters. If you're a desktop publisher, or you use very large text that makes spacing discrepancies immediately apparent, you will enjoy the level of control you get from StandOut.

PowerPoint's text styles are simpler to use than StandOut's because the program shows what styled text looks like as you try different options. PowerPoint offers neither as many styles, nor the spacing and alignment choices of StandOut's style sheets, nor does it include styled tab settings. Cricket Presents' style sheets are also less extensive than StandOut's.

Persuasion has the same basic features as the other packages: style, size, font, alignment, and color control of any chunk of text, and rulers to set tabs and margins. The program also includes commands for nudging text to the left or right, for setting line spacing, and for putting bullets in front of independent lines.

With its new spelling checker, thesaurus, and autokerning, Cricket Presents moves up to the front ranks. But StandOut still offers the widest range of subtle controls, and so takes the ribbon in this category.

GRAPHICS

A presentation would be pretty dry without graphics, even if they're only used to highlight word charts or tables. Each of the five programs has modest drawing features for creating and modifying objects, but they differ greatly in sophistication and use of color.

PowerPoint shows a curious mix of abilities. It has the weakest tool palette but at the same time offers a very strong set of color templates and palettes. The tool palette contains only a basic set of drawing tools and the style settings for these tools are more limited than those in other

PRESENTATION SOFTWARE FEATURES

	PowerPoint 2.0	Persuasion	Cricket Presents 2.0	More II	StandOut
Company	Microsoft	Aldus	Cricket Software	Symantec	Letraset USA
Price	$395	$495	$495	$395	$295
Online help	•	•		•	
Text Handling					
Integrated outliner		•	[1]	•	
Imports outline into frames	•	•	•	•	
Imports ThinkTank/More II outlines	•	•		•	
Text style sheets	•	•	[2]	•	•
Spelling checker	•	•	•	•	•
Manual kerning			•		•
Graphics					
Clip art		•		•	
Imports PICT, PICT II, EPS	•	•	•	•	•
Imports MacPaint	•		•	•	•
Imports TIFF, RIFF					•
Wraps text around graphics					•
Creates graduated colors	•	•	•		
Multiple-copy-and-move command			•		•
Colorizes imported graphics	•	•	•		
Charts					
Number of chart types	0	11	8	0	5
Pictogram charts					•
Reads WKS files		•			
Reads SYLK files			•		
Tables					
Table tool		•	•		
Decimal tabs	•		•		•
Links table and chart tools		•			
Production					
Graphic slide-sorter	•	•	•		•
Frames, notes, handouts	•	•	•	•[3]	•
Service bureau driver	•		•		
Network options			•		
Number of slide show effects	0	0	12	24	13
Layers in slide show		•		•	
Speaker's timer			[4]	•	

[1] *Outliner is separate desk accessory.*

[2] *Can use templates.*

[3] *Handouts only print with headers and footers.*

[4] *Sets transition effects for each slide and assigns delay to each.*

programs. You can't create complex images in PowerPoint, but you can make simple drawings.

PowerPoint's potent color handling may make up for its meager toolkit. You can select colors for fill patterns, lines, shadows, and contrasts. PowerPoint lets you create custom palettes of 256 colors, whereas Persuasion limits the number of custom colors to 40 and Cricket Presents limits it to 64. And, although color Macs can display only 256 colors on the screen at a time, PowerPoint can work with more than that, keeping extra colors in the frame files for output. Although 256 colors may seem like a lot, they can be eaten up quickly if you're working with graduated colors.

PowerPoint also contains excellent color intelligence. A dialog box prompts you to choose a background color, then shows good choices for foreground and contrast colors. You can choose from six different patterns for smoothly graduated colors, and apply these patterns to entire slides or to individual objects. PowerPoint's color handling produces beautiful effects (and some surprising color combinations). The color choices can be designated on a monochrome Mac. Without a doubt, PowerPoint is the most muscular color juggler.

Persuasion imports graphics and comes with a library of PICT clip art, including backgrounds, borders, arrows, maps, and lots of symbols. Persuasion lets you draw freehand shapes and polygons, and you can flip, group, and rotate objects. You can double or halve the view of a drawing and determine the offset of a shadow. A beefy set of alignment and centering commands enables you to place objects precisely. You can edit and rename any of the colors in the original set of eight, and you can define sets of colors for use with lines, shadows, and fills. You can create up to 30 layers per frame, a feature that is useful in slide shows.

StandOut doesn't have a freehand or polygon tool, but it offers more subtle control over graphics details and better graphics importing than any of the other programs. You can make text wrap around pictures or frames, controlling just how close to the graphic the text comes. You can also resize a picture by entering specific dimensions. You can customize arrowheads, and you can control the offset of drop shadows. In short, StandOut lets you perfect the details in the graphics you create.

Cricket Presents packs all of the basic drawing tools of PowerPoint, Persuasion, and StandOut. For most objects, you can set specifications such as tilt angle, fill pattern, or color. You can use Cricket Presents' predefined color palettes, or create your own. Cricket Presents does not use Apple's color wheel, but instead has sliders for red-green-blue or hue-saturation-brightness levels. Cricket Presents offers suggestions for background and blend colors. It isn't obvious, how-

ALDUS PERSUASION

Best Features: Integrated outliner; combined and thorough chart and table makers; clip art; smoothest interface (with pull-up menus for layers, styles, slides); layer animation in slide shows.

Worst Features: No slide service driver; creates largest disk files; limited graduated-color backgrounds; no special effects for on-screen slide shows.



Persuasion not only imports graphics, but also comes with a library of clip art, including borders, arrows, maps, and symbols. Freehand and polygon tools let you add your own touches.

ever, to which parts of the frame the different colors are assigned.

To create exquisite shaded colors, graduated colors, and color blends for frame backgrounds you just select beginning and ending colors, and Cricket Presents works it out. Too bad this doesn't work for individual objects too. Cricket may not have some of the detail controls of StandOut or the color clout of PowerPoint, but it does have the most rounded set of graphics commands.

More II's tool palette is basic, but it's accompanied by color-pattern choices for edges, shadows, backgrounds, and foregrounds. The program provides sophisticated mixing masks and an enlarged view for pixel-by-pixel editing. A special scope tool dictates whether changes occur only on the frame that's showing or on all the frames in the file—a handy feature if you're in a hurry. More II's clip art ability is first rate: you can select graphic art and objects, name them, save them to a menu, or save them to disk libraries.

If you don't need to tinker with the details of a graphic, StandOut offers you no real advantages. And the mixing masks of More II may be overly sophisticated for many presentation designers. The gorgeous colors of PowerPoint are tempting, but you may not want to trade away a full set of graphics tools for them. In the end, I'd pick Persuasion (for a full drawing kit and layers) or more likely, Cricket Presents (for a complete drawing kit spiced with useful special features).

CHARTS

Pies, bars, lines, and other types of charts are familiar to spreadsheet users everywhere. More II and PowerPoint have no chart-making abilities at all. Both programs do accept charts as cut-and-paste graphics from other programs, however. Once you bring charts in, you may use the drawing tools to modify them.

StandOut's chart-making capability is very interactive: you click on the charting icon, draw a rectangle the size of the chart you want to create, then position the rectangle in a frame. A prototype chart appears, and you customize it. You choose the type of chart (pie, line, bar, scatter, or column) and the relevant options for that chart type, such as whether to attach labels to the corner or center of a pie slice. The neatest trick in StandOut's charting is the pictogram chart. Finally, there's a data table where you either type the numbers used to create the chart directly or paste them from a spreadsheet program or another StandOut table. You can set the accuracy and notation (scientific or standard for numbers in the table.

Cricket Presents lets you create charts much the way StandOut does, but Cricket Presents has more chart types than StandOut—including area, stacked column, stacked bar, and simulated 3-D charts. Gridlines and legends, titles and labels, tick marks and plot markers are all in your control.

Persuasion's impressive charting facility lets you open a data entry table that remains with the chart you have created. Since the data entry table and chart are linked, changes to the table are reflected in the chart. You can also open an external data entry table that does not attach to any frame. You can type the data or read it from an ASCII or WKS file, and you can reverse the rows and columns if you would like a different orientation. Once entered, the data can be turned into a chart that will appear in the frame. Then you set the details, such as axes, legends, and value labels. You can choose from ten basic chart formats, or you can create your own. You control the ticks, grids, and number formats on each axis. Since Persuasion treats charts as graphical objects, you can use the style, fill, shadow, and color commands with them.

PowerPoint and More II come up with goose eggs in this category. And, although StandOut's pictograms and detail control are very alluring, Persuasion and Cricket

CRICKET PRESENTS 2.0

Best Features: Autographix connection; well-rounded features; flexible Acta outliner DA; powerful color commands for graduated backgrounds; thesaurus.

Worst Features: Outliner is separate; charts and tables are not linked together; no online help.



A well-rounded program, Cricket Presents offers a basic set of features including chart generation, a set of drawing tools, and the ability to import graphics.

Presents have the best all-around charting facilities. I prefer Persuasion, however, because its data entry table and chart-making facilities are integrated.

Tables

If you need to include tables in your presentation, Cricket Presents is your best bet, with Persuasion as a fine backup. The rest—More II, PowerPoint, and StandOut—haven't studied this facet of desktop presentation.

Persuasion uses the data entry work area in its charting facility as its table generator. Thus Persuasion treats tables as one more type of chart, giving you lots of control over colors, styles, and other aspects of a table's appearance.

Cricket Presents has an independent table generator that lets you dictate the size, font, color, and style for entries and for titles, the number of rows and columns, the alignment of entries, and the color of the lines and background. You can enter data on the spot or read it in from a SYLK spreadsheet file.

To create tables in StandOut, you must create a word chart with tabs. At least StandOut's word-chart style sheets include tabs, so you can create table styles for placing your data.

PowerPoint is also limited to tables built from word chart commands, but it does let you paste in spreadsheet data from Excel and annotate, color, and otherwise jazz it up. More II doesn't make any special provisions for tables. You can paste in a table from some other program, but you have little control over its style and format once it is imported.

Templates, Views, and Sorters

All five presentation programs offer templates, or prestructured frames, into which you can pour your own words and images. You can adjust the colors, fonts, and fill patterns to your liking. Any template can be used for a single frame or as a master whose features will be reproduced on all frames. In addition, each program lets you design your own templates.

MORE II

Best Features: On-screen slide show controls; integrated outliner that functions separately; wide range of graphics, and text importing and exporting.

Worst Features: No chart feature; no table maker; no slide service driver; limited sorting, handouts, and speaker's notes.



More II offers a lot of features for giving live presentations. You can view the current slide and your notes at the same time on screen. A Control Panel device shows you how much time you've spent on the slide during a presentation.

Persuasion's templates are best overall. Persuasion comes with a desktop reference guide that shows what its two dozen templates look like and suggests how to use them best. Six of the templates are in color, with their own customized color palettes. Persuasion also provides 16 suggested color schemes that are also shown in the desktop reference.

All of the programs let you look at your presentation in a variety of ways. More II lets you tile or overlap windows in various ways, and jump from window to window—a great feature for viewing multiple presentations at once. Persuasion can also open more than one presentation at a time. Persuasion's slide sorter displays thumbnail graphics of all the slides in a presentation, so you can reorganize the presentation by clicking and dragging the slides. Cricket Presents, PowerPoint, and StandOut have both slide sorters and title sorters for such rearrangement chores. With Persuasion you can only sort slide titles from within the outline. More II also lets you sort titles this way, but it does not have a slide sorter.

Cricket Presents and Persuasion let you view frames, speakers notes, and handouts. StandOut and PowerPoint let you view slides and speakers notes, but not handouts. More II has a notes window that you can attach to a frame, but it does not provide speakers' notes and audience handouts.

Persuasion's sorters are best overall. Cricket Presents' are a close second, with PowerPoint's slightly further back. More II falls behind because of its inadequate sorting and note-printing features. StandOut has weak sorting abilities and doesn't let you view handouts.

Production

Once you've created a presentation, you can take your show on the road. There are three ways to display your presentation: hard copy (prints and transparencies), photographic slides, and on-screen slide shows. For slides, I like Cricket Presents best, though PowerPoint is a challenger with great colors, font intelligence, and its new Genigraphics driver. For hard copy, Persuasion is tops, with a color-separation facility. But for on-screen slide shows, More II is unbeatable.

PowerPoint and Persuasion let you print everything—handouts, notes, frames—all at once, or one at a time. StandOut and Cricket Presents can also print everything you create, but not with a single command. Cricket Presents lets you assign a different output driver to each part of the presentation (frames, notes, handouts). PowerPoint can print in color or gray scale.

If you want to make photographic slides, you need to print your files on a desktop film recorder or send files to a service bureau. Cricket Presents comes with a driver and a communications utility that lets you send your files via modem to any Autographix service bureau for conversion into slides. Autographix can also make prints or transparencies from your files and get them to you in 24 hours.

You can send PowerPoint files via

modem to the Genigraphics service bureau for conversion to 35mm slides. PowerPoint's driver checks the frames for imaging problems (such as fonts that won't appear the same on the slide as they did on the Mac's display) and warns you of potential trouble. On non-PostScript devices, PowerPoint's driver treats PostScript fonts as screen-resolution bitmapped fonts. The Genigraphics driver also has an option for remapping the 8 colors of frames from a monochrome Mac to the 90 standard Genigraphics colors.

Persuasion comes with information on both Genigraphics and Autographix, and a promise that Aldus is working on a Chooser-level driver and communications software for presentation files. Symantec also promises that More II users will soon have a link to MagiCorp's slide-service bureau. Letraset USA promises a similar MagiCorp arrangement for StandOut.

Cricket Presents Office is a network system that includes a central program to track presentation projects and process batches of images to film recorders, ink-jet printers, or color thermal printers.

Besides using hard copy and slides, you can give a presentation using an on-screen slide show with a Macintosh monitor and LCD panel or a large color display.

All five programs have slide-show commands that enable you to show frames using the entire screen, as well as commands that remove the menu bar, windows, and controls from view. Each program also has a timer to automatically dictate the speed of the change from one slide to the next. You can also change slides manually by clicking the mouse.

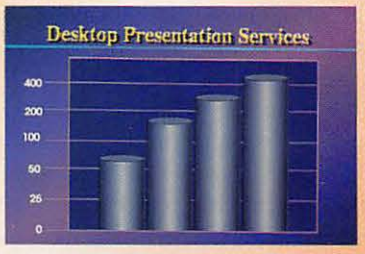
PowerPoint has the least impressive slide show—it has only one special effect, which lets you black or white out a screen during the show. Cricket Presents and StandOut each offer a dozen different special effects (wipes, venetian blinds, and so on) for the transition between slides. Persuasion lets you set the timing for displaying different layers of a frame. If you use layers for various parts of the text and graphics, you can create frames that walk the audience through complicated ideas, or you can even exercise a crude sort of animation.

More II is in a different league from the other programs in this category, with two dozen special effects, display of individual layers, and different time settings for each slide change. You can even view a pace chart during your presentation that shows you how much of your total time and how much of a particular slide's time you have used. When it comes to slideless presentations, More II is by far the best.

POWERPOINT 2.0

Best Features: Excellent color creation; colorizes black-and-white imported art and frames on monochrome monitors; Genigraphics driver for creating slides.

Worst Features: No outliner; no built-in charting; no built-in table feature; weak graphics creation and manipulation tools.

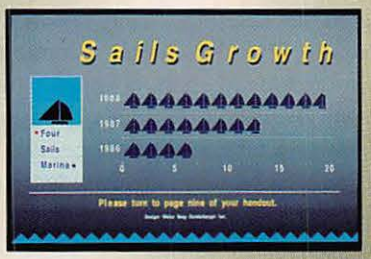


PowerPoint provides striking color choices for all parts of a slide. Although the program does not provide built-in charting, you can import graphics.

STANDOUT

Best Features: Pictogram charts; control of chart details with style sheets; imports TIFF and RIFF files for work with desktop publishing programs; slick Build and Subdue commands.

Worst Features: No outliner; no slide service driver; limited sorting and speaker's notes features; no online help.



StandOut's pictogram charts offer interesting graphical representation of figures as well as precise control over many of the details in a slide, such as kerning.

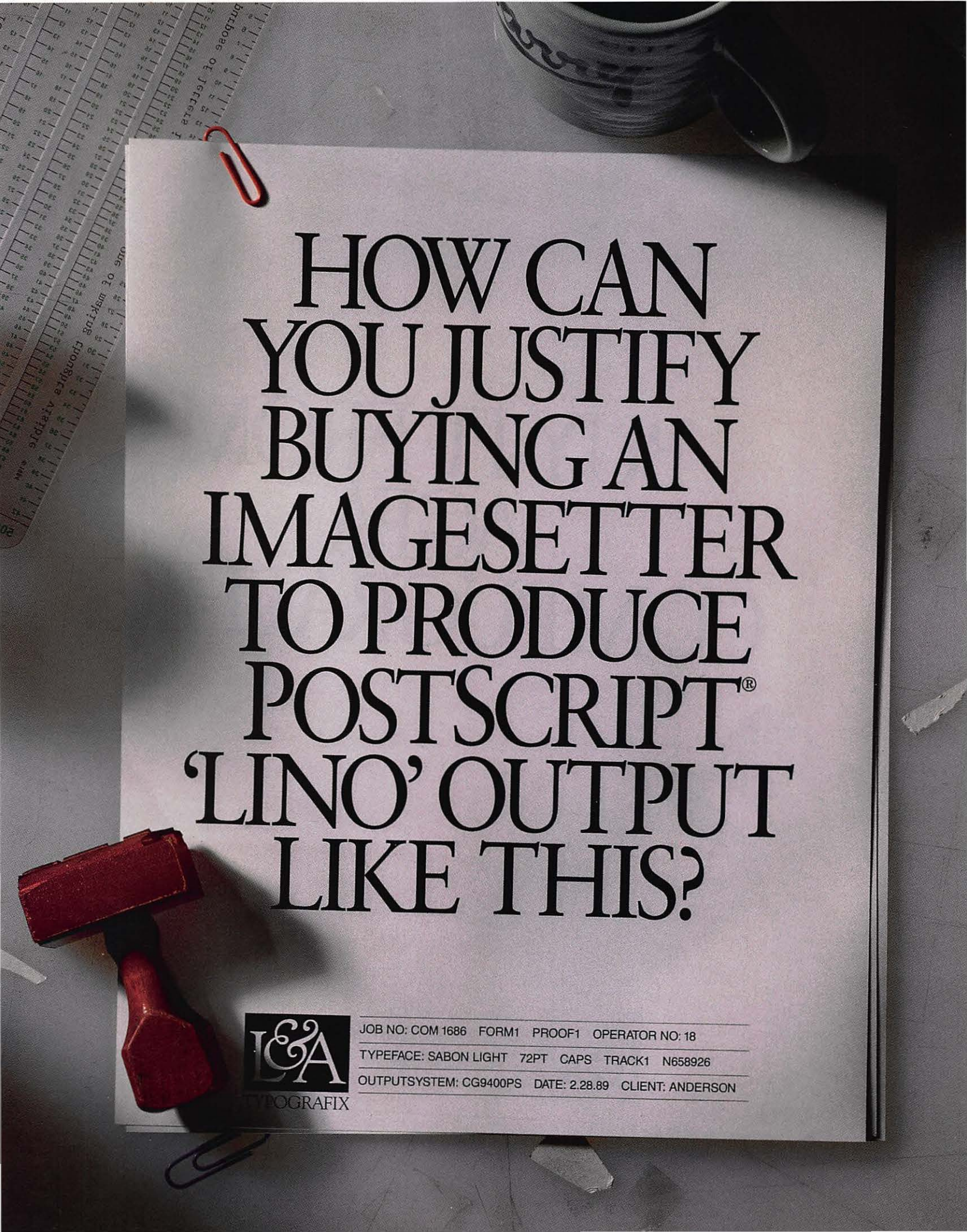
MAKING BETS

So which package do you bet on? If you're a desktop publisher who loves to play with fonts, kerning, and the exact appearance of graphics, then StandOut is the best bet. If you do a lot of on-screen presentations, then More II is best. Want sharp slides fast? Cricket Presents has a big lead there. If choosing good color combos is your downfall, then PowerPoint is the one for you. If you want integrated outlining along with excellent table and chart abilities, head for Persuasion.

Personally, I don't need the advanced outlining abilities of More II, nor do I expect to give on-screen presentations. I don't want to tinker with details, so StandOut is out. So is PowerPoint, because it lacks built-in charting and outlining, though I'll long for those gorgeous colors. The final choice for me is between Cricket Presents and Persuasion. Cricket Presents has the direct line to great slide production, while Persuasion has an integrated outliner. In the end, I'll go with Cricket Presents because it is the most well-rounded package; and I'll keep hoping that version 3.0 will have an outliner, more color power, and better table/chart facilities. M

See *Where to Buy* for contact information.

***Phillip Robinson** is the author of many articles and a half-dozen books on computer hardware and programming, and currently specializes in writing about graphics and CAD.*


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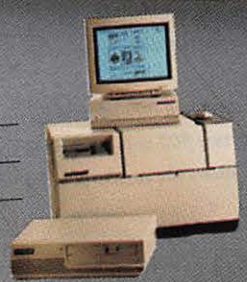
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REVIEWS

PHOTO OPS

PhotoMac 1.0

Pros: *Adaptive color palette; auto-select tool; color correction; separation controls.*
Cons: *No undo for selection changes.*
Company: *Avalon Development Group; distributed by Data Translation.*
Requires: *Mac II; 2MB; 8-bit color display; 40MB hard disk; System 6.0 or later.*
List price: *$695.*



You may think that the problems of separating color scans with the Mac are insurmountable. You're faced with multimegabyte files, the Linotronic's inability to produce *Architectural Quarterly*–quality separations of color scans, and the irreconcilable differences between what you see on screen and what finally comes off the press. It's kind of discouraging.

Avalon Development's PhotoMac, however, has been specifically designed for correcting and manipulating color scans, and it goes a long way toward making the Mac a true color-separation tool.

Not for Color Painting

PhotoMac is not a color paint program. It does have the marquee, lasso, paintbrush, airbrush, eraser, and eyedropper (for picking up colors from an image for use with other tools); but it's missing the square, circle, and text tools common to color paint programs. It also lacks special-effects tools such as those in PixelPaint, ImageStudio, and Digital Darkroom. And although it offers the choice between opaque and transparent paint, and you have the option of adjusting the transparency, this program is not designed for color painting but for manipulating and color-separating scanned images.

PhotoMac opens and saves 8- or 24-bit PICT and 24-bit TIFF files, and captures images directly from Data Translation's ColorCapture video frame-grabber board. Once an image is loaded, PhotoMac's adaptive palette adjusts the 256 colors available on an 8-bit display on the fly, providing the best choices for a given area out of the 16 million colors available (see "Color Correction").

PhotoMac insists on remapping the palette intermittently, and unfortunately, remapping takes several seconds. What's worse is that you can't control how often or when it will remap.

When you zoom in or out, scroll, or select an area for color correction, PhotoMac adapts the palette to offer the best color representation possible. You can't expect the screen image to perfectly match what prints on paper (phosphor and ink are just too different), but PhotoMac gets as close as it can within the limitations imposed by the hardware.

Choose Your Region

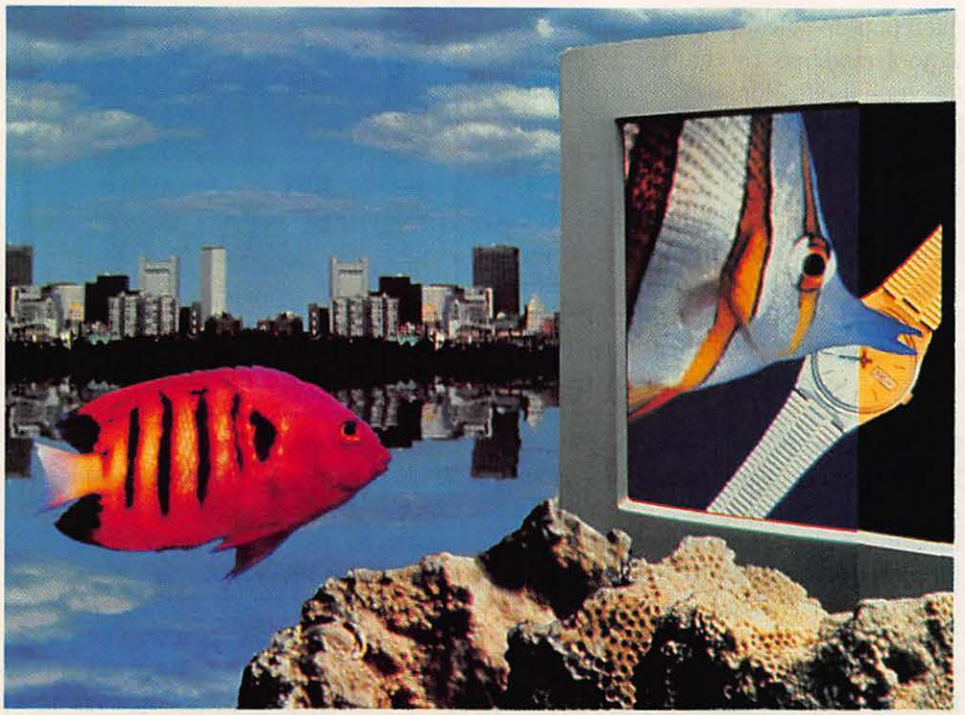
You can select areas with PhotoMac using the marquee and lasso, add to the selection by holding down the Shift key while selecting, or remove from the selection by holding down the and Shift keys while selecting with the lasso. You can use all those combinations to select noncontiguous areas—a patch of green here and another one there.

PhotoMac's most innovative tool, autoselect, lets you automatically select any area containing pixels within a given color range. You drag the tool through an area of color, and PhotoMac finds all adjacent pixels that contain similar colors. You could, for instance, select a blue sky above a green field. The autoselect tool is not perfect in its edge detection—it works best with relatively distinct areas.

Even with all these tools, however, it



Before and After
This image was scanned on a Howtek Scanmaster, saved as a 24-bit TIFF file, opened with PhotoMac, and separated on a Linotronic 300 with a 133-line screen at 2540 dpi. The first image is exactly as it came out of the scanner; the second shows the results of using PhotoMac's automatic tonal adjustment.



This photomontage was created in PhotoMac from eight separate images.

can take some time to select exactly the areas you want, and an inadvertent mouse click can lose all that work. It would be nice if PhotoMac had an undo option for selection changes, or even better, an option that let you select the same area again for further correction (rather than saving the image within the selected area to a file).

You can reverse the selection of an area (so everything that wasn't selected, is); cut, copy, and paste; choose the boundaries of the selected area; and smooth those boundaries—to blend a pasted image into the background, for instance. You can also apply smoothing (let's call it blurring), or sharpening (useful to give a more crisp, focused appearance). You can invert colors, invert from negatives (if you're scanning transparencies), or convert the image to 256 shades of gray.

The Tone Scale control provides contrast and brightness sliders for the image or the selected area, along with an Auto button that estimates the proper tonal range (see "Before and After"). The color-correction tool gives you sliders to explicitly adjust colors; you choose between red-green-blue (RGB) or lightness-hue-saturation (LHS) controls. You can adjust all the colors in the palette for the selection, or adjust only selected colors in the palette. The image changes on the fly as you move the sliders.

Separation Controls

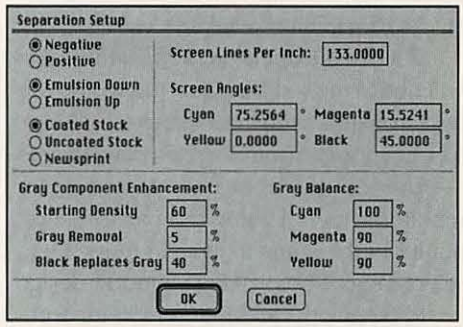
Scanning, display, selection, and correction are all just adjuncts to PhotoMac's real prowess: separation. It handles under-color removal, gray-component replacement, gray balance, and screen angles. It also corrects output for coated, uncoated, or newsprint stock, and lets you precisely control most of these parameters (see "Color Separation Explained," *Macworld,* February 1989). You end up with four PostScript files on disk, ready to go to the Linotronic at your service bureau.

You may not want to modify the separation parameters much, because the results are very good with the default settings. Limitations of PostScript Linotronic halftoning prevent PhotoMac from producing images worthy of *National Geographic,* but they far surpass newspaper quality. Moiré patterns are conspicuously absent, especially if you use PhotoMac's preferred 133-line halftone screen and the default angles for each process color (angles that are actually achievable with the Linotronic). Unfortunately, optimized angles are not provided for other screen frequencies.

PhotoMac's manual is a bit scanty, especially when it comes to the nitty-gritty details of process separation and color offset printing. The Separation Setup dialog, for instance, which is worthy of a small book, gets a page that basically recommends using the program's default values (see "Pulling Seps").

PhotoMac doesn't let you produce full-color pages with separated scans in place. You need to have the printer strip separations into pages. It does, however, give you the power to produce those separations yourself, for about $10 to $14 per sheet—$50 or so per separation.

PhotoMac does not put the Mac in the same class with the calibrated display and output hardware of the Scitex and the Crosfield scanning/correction/separation systems. But PhotoMac works, and it works well, making medium- to high-quality correction and separation of color scans a reality on the Macintosh.—*Steve Roth*



Pulling Seps

PhotoMac's Separation Setup dialog lets you control the most important separation parameters and provides defaults that result in good quality for most situations.



Color Correction

PhotoMac's adaptive palette uses the best selection of screen colors available for a given area. In this screen, the green areas have been selected using the autoselect and lasso tools.

POWERFUL PROGRAM

Photon Paint 1.1

Pros: *Powerful special effects; can open multiple windows simultaneously; 256-color support.*
Cons: *Extremely slow; poor documentation; nonstandard interface.*
Company: *MicroIllusions.*
Requires: *Mac 512K; second disk drive. Mac II with 2MB strongly recommended.*
List price: *$299.95.*

Photon Paint, originally developed for the Commodore Amiga, is a fully loaded paint program that includes a slew of special effects. Although a black-and-white version of the program is available, this review concentrates on the color version, which supports either a 2-, 4-, 16-, or 256-color palette display chosen from among the Mac's 16.7 million available colors.

When you open the application, you will notice immediately that the window is overcrowded with tool palettes. There's barely enough room for the drawing area —either on the SE or on a 13-inch color monitor screen. Hiding the palette helps, but it's bothersome to have to reopen it to select colors. Photon Paint's window design could be greatly streamlined if it incorporated pop-up palettes and allowed access to tool modifiers by double-clicking on the tool itself. Moreover, Photon Paint lacks several standard Macintosh paint tools—such as eraser, brush, pencil, and grabber.

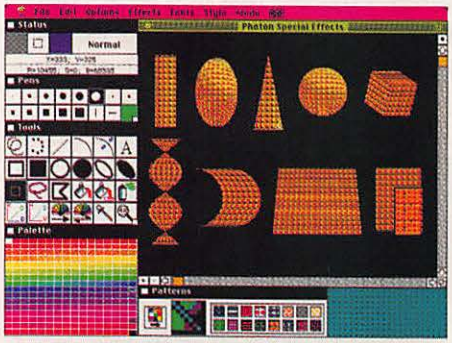


Image Wrapping
Photon Paint's imaging, wrapping, and distortion tools can sometimes produce unpredictable results, but they function well when applied to areas containing regular patterns. The top row (from left to right) shows wrapping around a cylinder, oblate spheroid, cone, sphere, and cube. Luminosity—used on the spheres—produces shading. The bottom row shows distortions such as Twist, Bend, Tilt, and Pixelization.

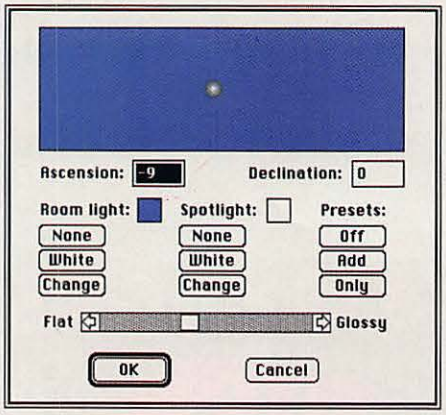
Photon Paint also fails to adhere to many standard Macintosh interface features: expect to waste considerable time with an inadequate manual that offers no graphics and little help when you're trying to learn to use a tricky new tool or feature.

Paint à la Mode

Photon Paint displays a status box showing all the currently active selections, including pen size and shape; active tool; fill and line color (with red-green-blue [RGB] value); and the paint mode. The Normal, Add, Subtract, Blend, and Wash modes enable you to achieve several interesting effects. The Add and Subtract modes will simply add or subtract, respectively, to the RGB values of the colors you paint over (you'll want to experiment, since the results vary greatly with each color). The Blend mode averages the RGB values of an area, producing a tinting effect that you adjust with the Set Blend option. The Wash mode is a bit more complicated, and only affects filled objects or custom brushes. As with the Blend mode, Active Colors will be combined with anything underneath, but you can drastically modify how they are combined, since the Set Wash option allows you to customize the vertical and horizontal wash separately.

The tool palette has freehand, straight line, and arc tools; an airbrush; fill tools; and various shape and lasso tools. The Controlled Arc tool allows you to define an arc's curvature by selecting its two endpoints and then stretching out a third direction point. In addition to the basic pen selections on the palette, you can create a custom pen using anything currently on the Clipboard.

Photon Paint also provides tools to help you customize the color palette. The RGB and HSB (hue-saturation-brightness) spreaders create spreads between any two colors chosen on the palette, which creates smooth transitions from one color to another. By using either the copy or swap tools, you can rearrange the position of colors on the palette. The eyedropper tool provides an easy way of selecting a color used in the painting by simply clicking on it, and double-clicking on any color in the palette itself will bring up the Color Picker wheel where you may define a custom color. You can save specific palettes and easily import them into another document.

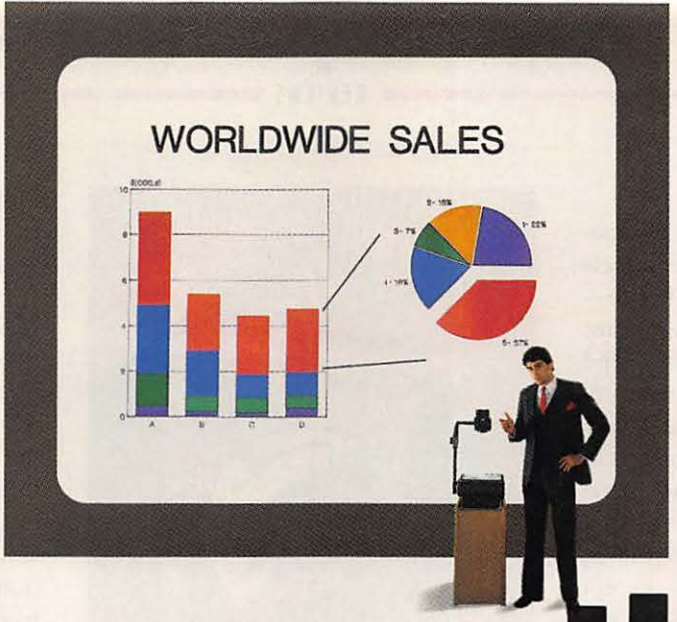


Luminosity Controls
The Luminosity dialog box enables you to control the color, location, and intensity of a light source for 3-D wrapping. The rather confusing controls are very poorly explained in the manual.

Wrapping It Up

One of Photon Paint's most powerful features is 3-D surface mapping. Selecting Wrap Onto from the effects menu brings up a submenu listing the various shape options: Cylinder, Cone, Sphere, Oblate Spheroid, Cube, Sides of a Cube, and Free Shape. The mapping process is fairly simple. Just select the area you want to wrap, then choose the shape from the menu options. An outline of the selected 3-D shape will appear, which you can then position and size. Getting the entire selection to completely cover the shape is easy with the Automatic Wrap feature. With the Luminosity control you may specify a light source's direction and color to create shading effects on 3-D objects. This, however, involves working with a highly confusing dialog box. Keep in mind that using 3-D surface mapping can be time consuming, especially when you are working with large or complicated selections.

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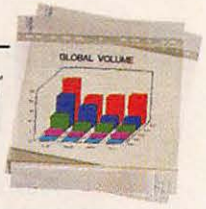


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Twist and Shout

Photon Paint contains several other special effects options under the Effects menu—such as Flip, Resize, and Rotate—which allow you to alter a selection's size and shape. Two unique features, Bend and Twist, enable you to determine degree of distortion. Simply click and drag over the sample square in the Bend box to achieve the desired bend, and the operation will be performed on the selected area when you exit the dialog box. Twist functions in much the same way, except that you set the degree by entering numerical values. Once again, you are provided with a preview of the final result. You can modify a selected area by *pixelization,* which averages the colors of existing pixels into larger pixels, producing a mosaic effect.

Although Photon Paint does provide you with a few powerful features and special effects, I feel that the program is unnecessarily difficult to use and that its overall performance is rather slow. The absence of quite a few of the familiar paint tools and the program's failure to adhere to many basic Mac interface standards are shortcomings. Though it's probably not the best choice for people who plan to purchase only one paint program, Photon Paint's unique capabilities could prove a useful addition to your library of graphics tools. —*Keith Baumann*

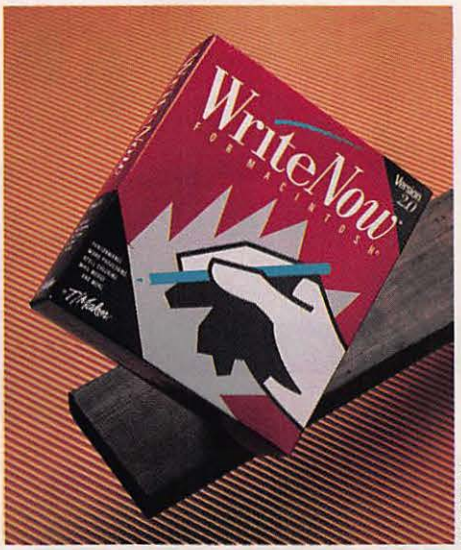
EFFICIENT AND CAPABLE

WriteNow 2.0

Pros: *Fast, superior spelling checker; font and spacing control; improved import and export to MacWrite and RTF.*
Cons: *Tables and columns a bit fussy.*
Company: *T/Maker.*
Requires: *Mac 512KE.*
List price: *$195.*



WriteNow has for several years been the most important "other" word processor in a field dominated by MacWrite and Microsoft Word. The original WriteNow provided most of the items on a MacWrite user's wish list.



MARK JOHANN

Version 2.0, in turn, nicely attends to the remaining wishes of WriteNow 1.0 users. Although it allows some manipulation of graphics and columns, and offers precise, fast formatting, it's not intended to compete directly with more expensive, extensively featured, programs such as FullWrite or Word. Everything WriteNow 2.0 does, however, it does right. As a word processor, rather than a composite program with page-layout ambitions, it's efficient, capable, and a bargain.

Specifics

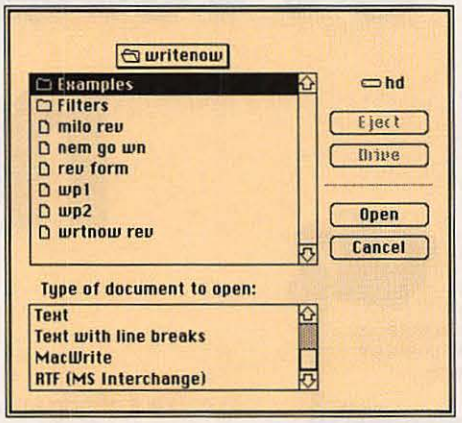
Before considering the new features in the upgrade, it's worth noting the reasons behind WriteNow's popularity. First, it's fast; its spelling checker, for example, runs 12 to 20 times faster than anyone else's. Checking a ten-page document takes 5 seconds rather than a minute or two. Format changes and edits are nearly three times faster than comparable operations in MacWrite 5.0, and 50 percent faster than in MS Write or Word 3.02. Second, it's small. Despite a long feature list, WriteNow needs only 102K of RAM, so it can be used with Excel or a modest-size database under MultiFinder on a 2MB Mac and still handle large documents. Third, it doesn't crash during large block editing changes on documents longer than a hundred pages, as most of its competitors do. Fourth, it offers easy-to-learn extensions of the ruler-based formatting familiar to most MacWrite users. Finally, WriteNow's Undo command can undo all types of complex formatting changes. Any one of these points is a real plus; taken together they are positively endearing.

What's New for Now

Version 1.0, however, had a problem: file exchange between WriteNow and other word processors was handled awkwardly through a stand-alone translator program. In 2.0, the Open and Save As commands in the File menu deal directly with text, MacWrite, and DCA and RTF files (created from Word) (see "Flexible Filer"). T/Maker has promised direct use of Word files without RTF mediation for Spring 1989.

Version 2.0 also features a mail merge facility as complete and well designed as that in Word 3.02 (it's compatible with Word templates and data documents). Form letters can accept any comma- or tab-delimited data files, the two most common formats for saving files from databases as text. In addition, form letters can use IF-THEN logic and INCLUDE directives for intelligent merging and for concatenating letter segments. Form letter templates can also contain prompts that request additional information for data fields or for finding merge files from any accessible folder. T/Maker also offers registered users (for a $5 handling fee) an Extras disk. It includes an assortment of form letter templates with merge examples and predefined mailing label templates in

(continues)



Flexible Filer
The number one important new feature in WriteNow is integrated file import and export (the first version required a stand-alone translator). New file conversion types can be added directly to the scrollable list.

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fonts with versions optimized for LaserWriters and ImageWriters.

The last major improvement that WriteNow 2.0 offers is a 100,000-word dictionary, recommended for standard use, and a 50,000-word dictionary provided for floppy-based systems. T/Maker also provides an empty dictionary for users to create personal glossaries; the Extras disk includes a computer industry buzzword dictionary.

Small but welcome touches in the new WriteNow include a Count option (characters, words, paragraphs), a date/time stamp (fixed or updatable), impeccably correct behavior in social situations (on networks and under MultiFinder), and better printer control (odd and even pages, forward and reverse order).

Mostly Write, Now

WriteNow doesn't attempt to provide the laundry list of features found in programs such as FullWrite. You don't get line- and box-drawing capability or other drawing tools. You can't generate many special characters or math symbols. You don't get style sheets as such, although you can easily mimic many style sheet features. WriteNow doesn't do tables of contents or indexes, and doesn't have Word-style glossaries, macros, or full-page preview. You do get to specify up to four columns in your layout, but the program decides automatically how big these should be. And while you can set up tables, this process still involves lots of fussy manual work setting tabs on the ruler.

All in all, T/Maker has done a great job of satisfying the needs of most word processing users, leaving fancier, not-really-word-processing functions to others. Normally I would rather schedule myself for major surgery than learn a new word processor, but despite this reluctance I have switched to WriteNow 2.0 for daily use—it's incomparably fast and friendly. If you want to try page layout without actually buying a real desktop publishing program, you should undoubtedly check out FullWrite Professional or Word 4.0. But WriteNow is clearly the winner for the majority of text- and document-handling chores in most business and personal applications. —*Charles Seiter*

OVERVUE'S SUCCESSOR

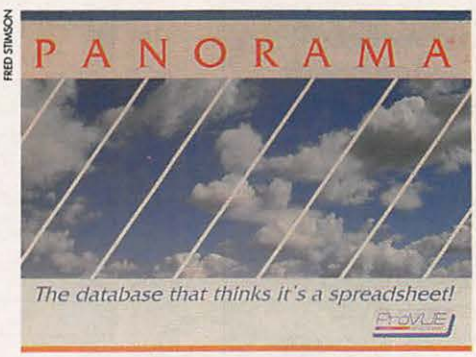
Panorama 1.0

Pros: *Fast; excellent data entry features; extremely flexible generation of forms and reports.*
Cons: *Database size limited by available RAM; nonstandard user interface; poor error handling.*
Company: *ProVue Development Corporation.*
Requires: *Mac Plus.*
List price: *$395.*



Back in 1985, when the Mac was still new and software was scarce, one of the first database programs to arrive on the scene was OverVue from ProVue Development. Chief among its virtues was its speed, sorely needed in those days of 400K drives, and its easy, spreadsheetlike display of data. The revision of the program brought several unique features to ease data entry, and a remarkably full-featured macro capability. The program had its darker side, however. It didn't get along well with desk accessories. You couldn't use Macintosh fonts on the screen or in reports. And OverVue's user interface was annoyingly different from that of most Mac programs. As the Mac database market grew, OverVue lost ground to such competitors as FileMaker and Microsoft File.

Panorama, the successor to OverVue, retains most of the older program's strengths and addresses many of its weaknesses. Billed as "the database that thinks it's a spreadsheet," the program allows you to see several different views of your data.



FRED STIMSON

The most basic is a data sheet made up of rows and columns, much like a spreadsheet. You enter data into the file, moving from cell to cell. Every Panorama window has a tool palette that enables you to perform functions appropriate to the window. The palettes' icons have pop-out labels, to remind you of their functions (see "Data Palettes").

Letting you manipulate data in the data sheet is another way Panorama resembles a spreadsheet. With a minimum of effort you can fill columns with data and sequence numbers, and search and replace the contents of fields in many records. Panorama gives you complete font and size choices, and Mac II users can specify one of seven colors for cells, lines, and columns. Different parts of the data sheet may be assigned default colors and styles.

Many math and text-conversion functions are included, and you can set up automatic calculations in the data sheet and in forms and reports. Bar, line, pie, area, and scatter charts may be generated from the data. While it's not a relational database, Panorama lets you automatically look up data from another Panorama file and paste it into the current record during data entry.

Panorama lets you either record macros or type them in using the included script editor. The editor has all of the macro commands and functions available in menus, saving a lot of typing, and the program checks command syntax automatically. Finished macros can then be executed from a Macro menu displayed in the menu bar. You can set up dialog boxes for user input as part of a macro and create buttons on forms that activate macros.

Easy Entry

Entering data into a database file is often a thankless task, and it is easy to enter data incorrectly. Panorama has many features that improve accuracy and speed data entry. If a field is designed to have only a limited number of values, you can set up Value Bars that have radio buttons corresponding to the possible choices. The program gives you complete control over capitalization on a word or sentence basis. You can set up Input Patterns that allow

(continues)

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you to type in a stream of data that the program formats correctly for you. For example, you just type in 8005551212; the program formats it as (800) 555-1212. Output Patterns give you exhaustive numeric and date formatting, including expressing numbers as words, so that "$12.50" becomes "twelve dollars and fifty cents." Panorama can also check that entered data is within a specified range, check for duplicate records, and fill in default values. It even lets you enter Prompts that tell you the allowable values for a field during data entry.

Perhaps the single most useful data entry feature is Clairvoyance. Most databases contain fields where the same value is entered in record after record. As you type in a field, Clairvoyance scans the previous entries for a possible match. When it sees that you're typing a repetitive entry, it fills in the rest of the field with the previous value.

Flexible Forms, Versatile Reports

Panorama's form-design capability is powerful and flexible, and it will be immediately familiar to MacDraw users. However, in some ways, it has more features than the original MacDraw. There are the usual rectangles, circles, and lines, but Panorama lets you resize many objects at once, align and group them as needed, and even nudge objects one pixel at a time. The program can also automatically lay out data cells.

It's easy to create your own mail-merge letters entirely within Panorama, eliminating the need to merge data with a word processing document. ProVue has also included a forms Cookbook, with several predesigned form templates that you can copy and paste into your own databases.

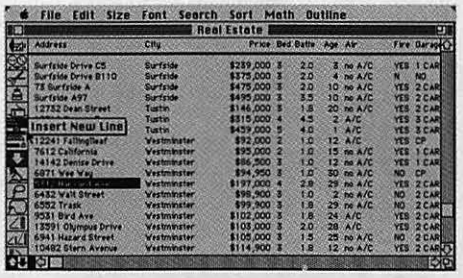
Reports are just another type of form, intended for printing rather than screen display, and are created in much the same fashion. The different parts of a report—the header, body, footer—are created in tiles, which work together to make up the full report (see "Report Tiles"). Using these tiles, you can easily create reports in Panorama that would be extremely difficult or even impossible to create in other programs.

Flashing Pictures

Most Mac databases now allow you to paste in picture fields, but Panorama's approach is unique. Called Flash Art, it stores only one copy of each picture within a database. You give the picture a name, and whenever you enter that name into the database, Panorama displays the associated picture. Because pictures often take up a lot of disk space, this approach can save considerable space if you need to use the same picture in several records. Pictures can also be stored in and retrieved from disk files, but access will be slowed. PICT is the only file format supported.

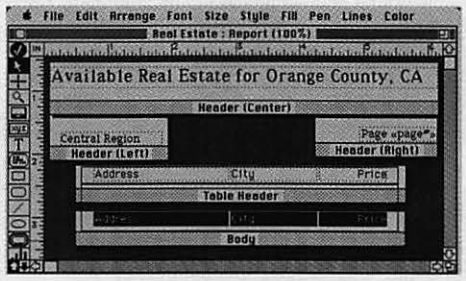
Bugs and Annoyances

Panorama has several problems that need attention. The program occasionally doesn't redraw the screen properly after an operation, especially under MultiFinder. In horizontal scrolling, the data sheet jumps by columns, rather than scrolling smoothly. On a standard Mac Plus or SE, screen redraws can be a bit slow, and some alert boxes come up blank, with no text, just an OK button. Attempting to undo a sort operation can cause the program to bomb, as does reopening a file that was just closed. The program follows the Mac interface guidelines more closely than OverVue did, but Panorama still has several odd interface choices. The Size menu comes before the Font menu. You control font style and color through an item in the Edit menu, rather than in the Font or Size menus. The program's use of hierarchical menus is also sometimes awkward.



Data Palettes

Every Panorama window has a tool palette, and each tool sports a pop-out title to remind you of the function it performs.



Report Tiles

This is Panorama's Graphics Mode, showing the tiles that make up a custom report. The arrangement of two major columns with minor data columns within would be very difficult to produce using most other databases.

The most serious problem with Panorama lies in adding and deleting records. When you are entering data in the data sheet, pressing Return adds a record, and pressing the Backspace or Delete key deletes a record. In both cases, Panorama fails to warn you that the operation is going to take place. It is much too easy to accidentally or unknowingly delete data from a Panorama file. Unlike most database programs, Panorama doesn't save data whenever you press the Enter key. You can retrieve accidentally deleted records by using the Revert to Saved command, but this also undoes all other changes to the file since the last save, including any that you might want to keep. The user should be warned that the program is about to delete a record. At press time, ProVue stated that it was nearing completion on a program update that addresses these problems and adds several new features. The update will be sent free of charge to all registered Panorama owners.

Memory, Disk Space, and Speed

One of Panorama's limitations is also the reason for its superior speed. Unlike most database programs, Panorama keeps all the records in a file in RAM. Because the program doesn't need to read and write records to disk, data manipulation is fast. Although the entire database needs to be able to fit into available RAM, this should not really limit file growth in most cases. My test file, with 5000 records, took up about 80 percent of the available memory on a 1-megabyte Mac Plus.

When I used the program's Compressed Data Type feature (which uses memory

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The easiest way to learn Macintosh software is to play it by ear

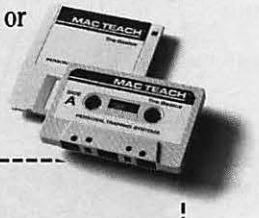
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flat and four-color process printing. For a fraction of the time and cost of conventional methods.

The printer has the advantage of a 68020-based Atlas controller running at 16 MHz, so you can see your results faster. You can print an 8½″x11″ page in just under one minute. An 11″x17″ page in just under two. And the quality is excellent. The ColorScript 100 uses a thermal transfer process that produces true 300x300-dot-per-inch resolution.

New Model 20—more affordable and upgradable

The original ColorScript 100 is the Model 30, with 8 megabytes of memory, a 20-MB hard disk built in, and the ability to print up to 11″x17″ pages.

The new QMS ColorScript 100 Model 20 is more affordable. It has 4 MB of memory and the ability to handle letter-size (8½″x11″)/A4-size paper. It provides the same high-quality output as the Model 30, and can be fully upgraded to a Model 30 when your needs expand.

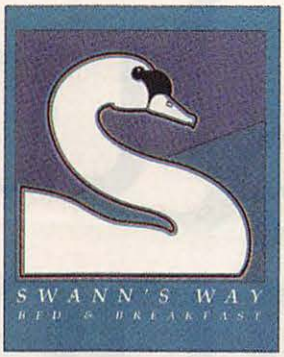


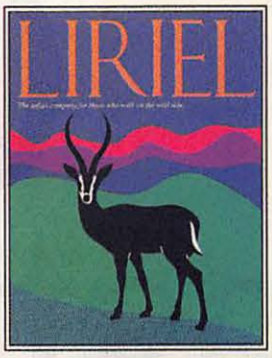
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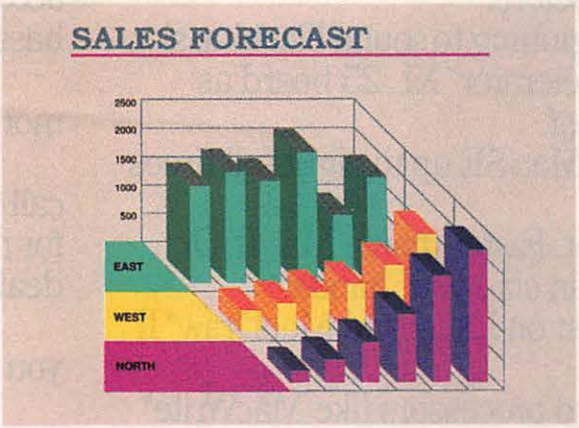
For more information on the QMS ColorScript 100, including a list of compatible software and information on financing, call 1-800-631-2692, ext. 222.





Pictured are just some of the ways designers are using the QMS ColorScript 100. The creative director at one design firm notes: "We're doing comps that used to take hours in minutes. The quality is fantastic." A computer design system manager in the Midwest says: "Our clients are getting more options, in less time, at lower costs."



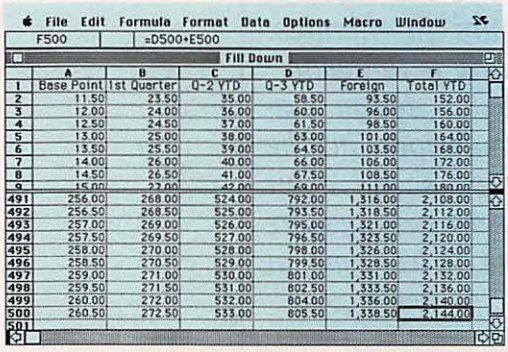


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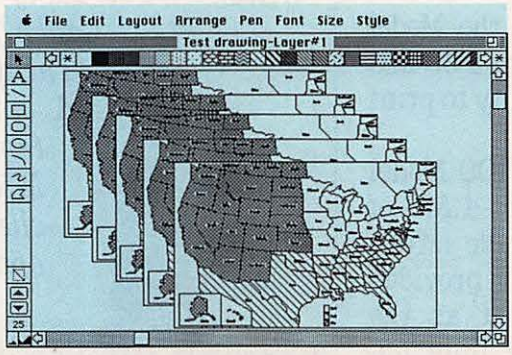
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1	Base Point	1st Quarter	Q-2 YTD	Q-3 YTD	Foreign	Total YTD
2	11.50	23.50	35.00	58.50	93.50	152.00
3	12.00	24.00	36.00	60.00	96.00	156.00
4	12.50	24.50	37.00	61.50	98.50	160.00
5	13.00	25.00	38.00	63.00	101.00	164.00
6	13.50	25.50	39.00	64.50	103.50	168.00
7	14.00	26.00	40.00	66.00	106.00	172.00
8	14.50	26.50	41.00	67.50	108.50	176.00
9	15.00	27.00	42.00	69.00	111.00	180.00
491	256.00	268.00	524.00	792.00	1,316.00	2,108.00
492	256.50	268.50	525.00	793.50	1,318.50	2,112.00
493	257.00	269.00	526.00	795.00	1,321.00	2,116.00
494	257.50	269.50	527.00	796.50	1,323.50	2,120.00
495	258.00	270.00	528.00	798.00	1,326.00	2,124.00
496	258.50	270.50	529.00	799.50	1,328.50	2,128.00
497	259.00	271.00	530.00	801.00	1,331.00	2,132.00
498	259.50	271.50	531.00	802.50	1,333.50	2,136.00
499	260.00	272.00	532.00	804.00	1,336.00	2,140.00
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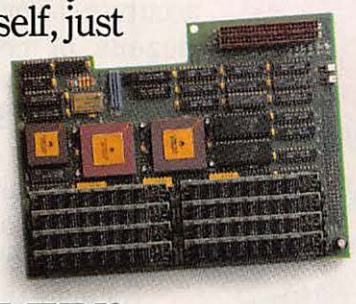
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more efficiently but requires an extra step to set up), the same 5000 records took up only 60 percent of RAM, so I could have added a couple thousand more records without overtaxing my machine. The program takes advantage of whatever amount of RAM your machine has, so files on a 4MB or 8MB machine can become very large indeed. Panorama files are also efficient in using disk space. For example, the test file required 275K on my hard disk; FileMaker II needed 958K to store the same data.

The Long View

Panorama is definitely well worth considering if you are in the market for a flat-file database. Panorama's forms- and report-generation capabilities are among the best available, and its data entry features are unsurpassed. Panorama is not an appropriate choice for extremely large databases because of its need to fit files entirely in RAM, and it is not a multiuser program. However, most Mac users will not run into the file-size limitation and should be favorably impressed by Panorama's speed and flexibility.

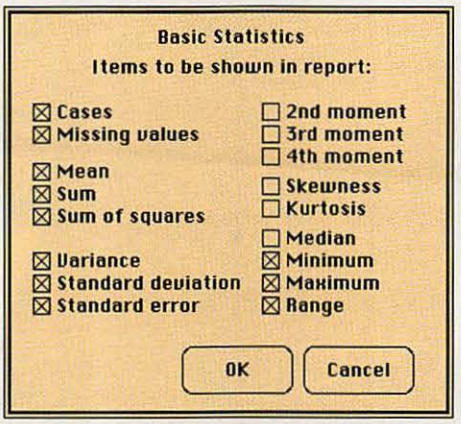
—*Tom Negrino*

STATISTICAL SOFTWARE

Exstatix 1.0.1

Pros: *Convenient interface; automatic background computation; rotatable 3-D plots; presentation-graphics enhancements.*
Cons: *Limited variety of statistical graph types and import/export modes.*
Company: *Select Micro Systems.*
Requires: *Mac 512KE; System 6.0.1 required on Mac II.*
List price: *$349.*

There are now more good statistics programs for the Macintosh than for any other computer. By *good,* I mean complete, well-designed programs that are easy for both beginners and experts to use and that output high-quality graphics. By those criteria, in fact, the Mac is the only computer with more than two such programs.



Report Contents
Exstatix enables you to specify the details of statistical report contents. You can also specify whether you want to see this dialog box's choices each time you call for a report.

And now there's yet another strong contender, Select Micro Systems' Exstatix, which offers more features than comparably priced software such as Data Desk Professional, from Odesta (reviewed in *Macworld,* October 1988), and Stat-View II, from Abacus Concepts (*Macworld,* April 1988).

The Basics

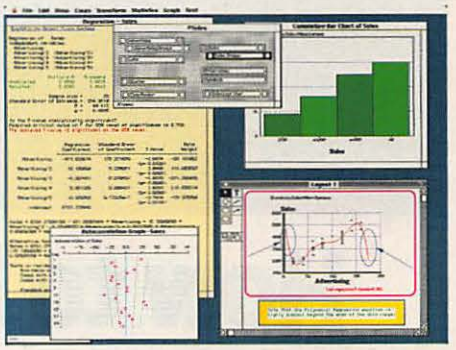
Exstatix includes the standard descriptive statistics, the t- and chi-tests, and the simple ANOVA found in beginning statistics courses. It allows algebraic and functional manipulation of data sets through a menu for specifying data transformation. Regression capabilities include seven nonlinear types and most common kinds of analysis of residuals (Exstatix prints out regression reports, with an explanation of the meaning of procedures, to a report window).

The program also provides limited direct analysis (moving average, lag, lead) of time series, and autocorrelation study of time-series data. The Test menu lists t and Scheffe comparisons; one–way, two-way, and n-way ANOVA; and Kolmogorov-Smirnov, Runs, Wil-coxon, Mann-Whitney U, Cochran Q, and McNemar tests. The program lets you select different levels of direct control over these tests, with the option of resetting default confidence levels and other computational features each time a test is used, if necessary.

The Upside

Exstatix has a singularly useful innovation: while you are staring at the screen or tapping in new data at 20 baud or so, the computer has lots of free time, which the program uses to compute basic descriptive statistics in addition to a variety of calculational intermediates. This means that it can post most results as fast as you can select a test, even for data sets with several thousand records. This feature is especially important since Exstatix does not explicitly support 68881 coprocessors. If you perform complicated functional transformations on large sets of variables, you will find this implementation detail handy.

Another one of Exstatix's strengths is its support for preparation of statistics-related documents. The summaries of test

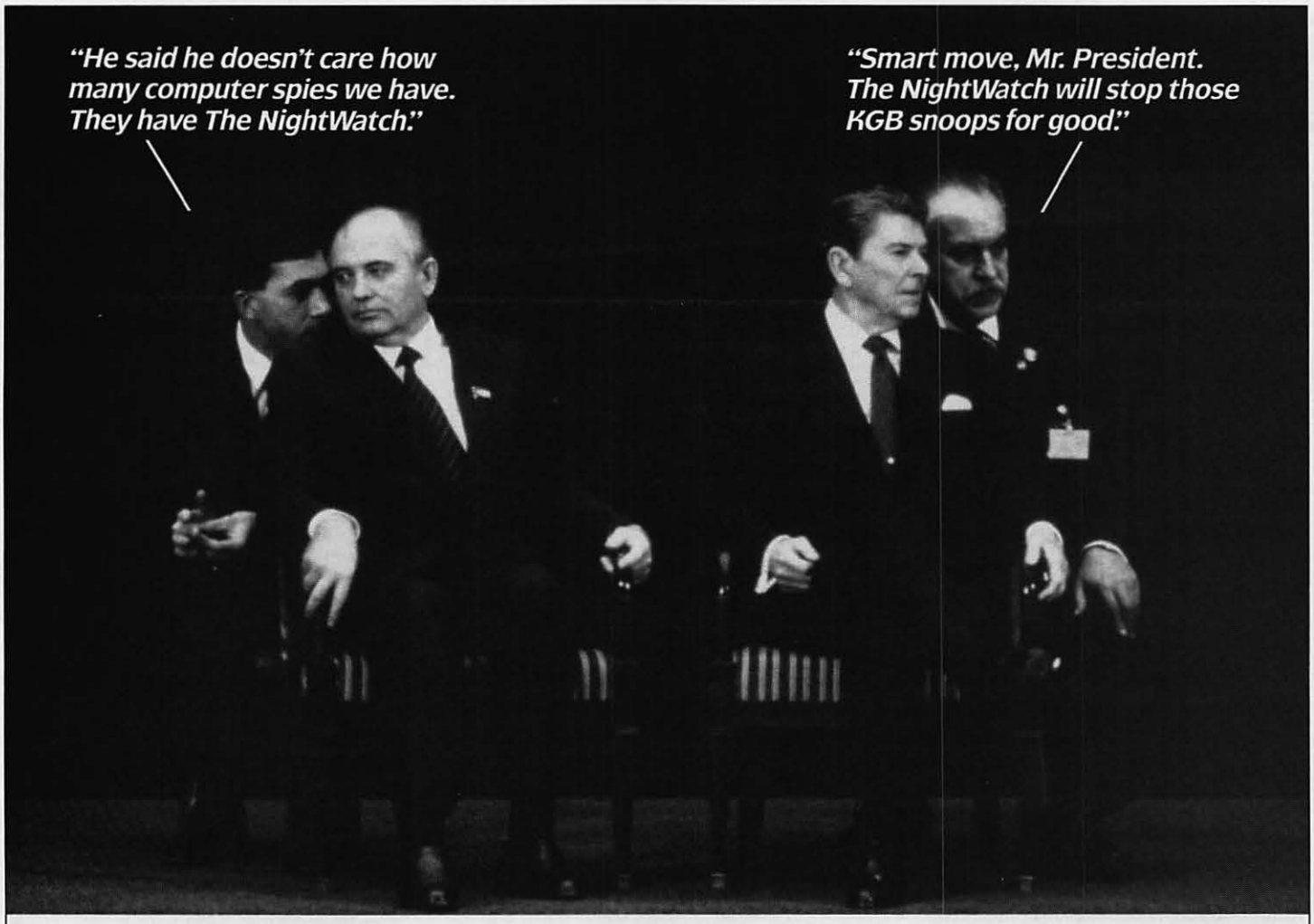


Multiple Reports
Exstatix can create color graphics and reports in multiple windows on the screen.

statistics, which can be copied to a word processor, are informative almost to the point of being chatty. The program is compact enough that it can perform with no problems under MultiFinder on a 1-megabyte Mac with Word, MacWrite, or WriteNow. A Layout facility allows customization of graphs, providing an overlay plane for text and legend material, in addition to axis scaling and data-point styling with your choice of line styles and fill patterns. Layout windows can be saved as PICT files as well as in the Layout format. All graph features can be in color.

Finally, Exstatix provides a 3-D Scatter Plot option that amounts to a simplified version of MacSpin. Although Data Desk has a more comprehensive version of this

(continues)



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option, it's encouraging to see that rotatable 3-D plots are now a feature we can expect to see integrated into Mac statistics packages.

The Downside

Exstatix has a few limitations. The documentation is less extensive than that found in StatView 512+, and isn't even in the same league with the standards set by Data Desk. The program lacks some common and useful statistical plot styles (sunflowers, point sizing) for handling data-point overlap. If you need more control over plotting modes or flexibility in producing business presentation graphics, StatView II is a better choice. By current standards, Exstatix's file-import capability is also limited: the program imports its own files and most ASCII text files, but it has no automatic file exchange for SYLK or DIF files.

Another drawback for some users is that further statistical test development (factor analysis, cluster analysis, transform-based analysis of time series) is largely in the hands of outside developers. Select Micro Systems has provided explicit guidelines and a simple set of interface hooks for adding user-developed test menu items. If you have Pascal or C source code for specific statistical procedures, it's easy to incorporate the procedures (factor analysis, for example) into Exstatix. Development of a wider array of tests, however, must await the evolution of third-party support or user groups.

Business, Not Academia

The examples and references in the program manual indicate that Exstatix has been designed primarily for business support; they emphasize analysis of advertising, sales, and marketing data. The program is not a complete academic package in the style of Systat, although it does have a good repertoire of tests, plus more-than-adequate graphing features and uniquely helpful statistical reports.

If its test selection meets your needs, or if you have developed procedures you would like to merge with a general business statistics package, then Exstatix deserves serious consideration.

—*Charles Seiter*

WORM DRIVE WITH SOFTWARE

APL-800WD

Pros: *Creates a permanent, nonerasable archive of data; relatively low cost per megabyte of storage.*
Cons: *Internally terminated; no external SCSI ID switch.*
Company: *ADIC.* ***Requires:*** *Mac SE.*

WriteImage

Pros: *Performs mirror backups faster than some tape systems.*
Cons: *No incremental backup capability; can't back-up over network; not compatible with version 2.0 of the Apple HD SC driver (ships with System 6.0.2).*
Company: *ADIC.*
List price: *With APL-800WD $4995.*

Optical Disk Interface Software

Pros: *Treats WORM disk as typical HFS volume; MultiFinder compatible; permits file-by-file copying; allows access to previous versions of files.*
Cons: *User interface could be better.*
Company: *ADIC*
List price: *$550; with APL-800WD $5545.*



Write-once, read-many (WORM) optical drives tread the middle ground between erasable devices (hard disks and floppies) and read-only devices (CD ROMs), because you can never erase text and graphics on a WORM cartridge. Thus WORM drives let you archive data—whether that data is a hard-disk backup, company financial records, or graphic images.

All WORM drives use lasers to read and write information onto special WORM optical disks, which are encased in hard plastic shells and are removable like floppies. Each worm disk has an unformatted capacity of 800 megabytes.

One laser within the drive writes data by melting tiny pits into the surface of the disk media. Another laser then reads the data by "seeing" the pits on the disk. Because those pits are irreversibly melted into the media, any information you write to the cartridge is there to stay.

The APL-800WD, from Advanced Digital Information Corporation (ADIC), comes with a SCSI interface cable (Mac-to-SCSI or SCSI-to-SCSI, your choice) and one 5 1/4-inch WORM disk. Connecting the APL-800WD is just like hooking up any other SCSI device to the Mac, but I do have two small complaints. First, there is no external switch for setting the drive's SCSI ID number (it comes preset at 5). You can, however, open the drive chassis and select an alternate ID number. Second, because the APL-800WD is internally terminated, it must be the last SCSI device in a daisy chain—unless you call ADIC for directions about how to remove the terminating resistors.

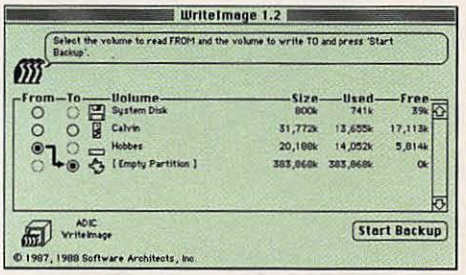
ADIC offers two different ways to control the APL-800WD. Which software package you choose depends on how you plan to use the WORM drive.

Mirror This

With WriteImage backup software you get a Control Panel file called Laser Library. This library contains the driver necessary for the Mac to recognize the WORM drive and WORM volumes; it also enables you to list, get information on, mount, and unmount the backup volumes on the WORM cartridge.

Backups performed with WriteImage are true mirror-image backups. The application copies every single sector from the hard disk (the source) to the WORM cartridge (the destination), regardless of

(continues)



Mirror This

When you back up with WriteImage, you must remember that you're writing to write-once media. You click on radio buttons to designate source and destination of the backup (shown by the black arrow at left); the program tells you the size of the volumes being copied and whether space is available.



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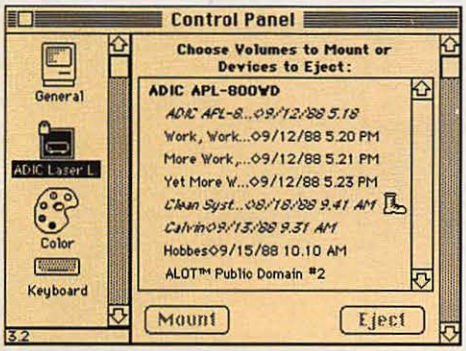
Suggested retail price $295.



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Mass Archive

When you insert a WORM disk used by WriteImage, Laser Library's window shows a list of available volumes; scroll down, and you get more information (size, date created) on the volume. Mounted volumes appear on the desktop with a special icon.

whether or not those sectors contain any data. In other words, if you've only used 13MB of a 30MB hard disk, you will back up 13MB of data and 17MB of blank space to the WORM cartridge. You cannot write over that blank space.

It took WriteImage 1 minute and 5 seconds to back up an 800K disk to the APL-800WD and about 12½ minutes to copy my internal 20MB hard disk; that beats or compares favorably with backup times for tape drives (see "Why Say No to Backup?" in the November 1988 issue of *Macworld*).

WriteImage does not let you back up to the APL-800WD over a network. You can, however, publish the volumes on the WORM disk as AppleShare or TOPS volumes for access over the network.

I encountered no problems restoring and mounting floppy volumes and external hard disk volumes from the WORM disk. I did, however, have considerable trouble mounting the SE's internal hard disk (the start-up disk) volume from the APL-800WD. Either WriteImage would crash—in the middle of the backup—or the WORM drive with WORM disk inserted would spin wildly at start-up, effectively preventing the Mac from booting. Finally I had to reinstall System 5.0, because the problem was due to WriteImage incompatibilities with the Apple HD SC driver used in System 6.0.

Mounting a volume on the WORM disk is easy with Laser Library, and mounted volumes behave exactly like locked floppies. You can copy files, access data, and even run applications from the WORM drive. There was little difference in the time the WORM drive took to open a volume (2 seconds for an 800K disk versus 3 seconds for a copy of the same volume on the WORM), but there was a large difference in application launch times (9 seconds from the 800K versus 30 seconds from the WORM).

Familiar Appearances

The second software option comes from, and is supported by, Corel Systems, in Ottawa, Ontario (the software is also available separately from Corel). Corel's Optical Disk Interface Software takes a different approach to integrating the WORM drive with the Mac, by making the WORM more than just a backup drive.

Corel's device driver, called WORM.INIT and included in the Optical Disk Interface Software, enables the Mac operating system to see the WORM drive as a typical HFS-compatible magnetic disk. Should a cartridge be in the APL-800WD during start-up, that volume appears on the desktop just like a hard disk or a floppy. You can run applications on the WORM cartridge, copy files to it in the Finder by dragging, even throw files into the Trash Can.

Corel provides three utilities with WORM.INIT: Worm Diagnostics, Worm Format, and Worm Tools. Worm Diagnostics performs a set of read and write tests on the drive and WORM cartridge.

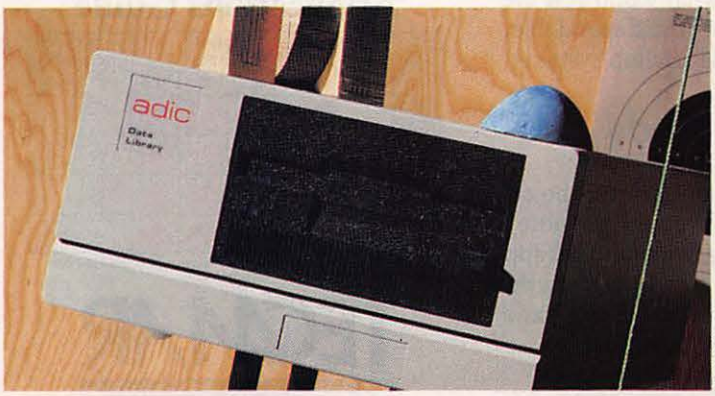
Worm Format formats one side of a WORM cartridge so that it can be recognized by the WORM.INIT device driver. There's an option to divide the cartridge into partitions in user-selectable sizes. Worm Tools is probably the utility you would use the most with an APL-800WD. First, it enables you to mount and unmount cartridges—for example, to change cartridges. But it also lets you access old versions of files on the cartridge through History Markers.

Selecting the List/Select History Markers function in Worm Tools displays a list of past cartridge states by time and date. When one of these markers is chosen, the cartridge is mounted and placed in read-only mode; all files written to the cartridge at the time of that History Marker are then available for you to copy to a hard disk or floppy.

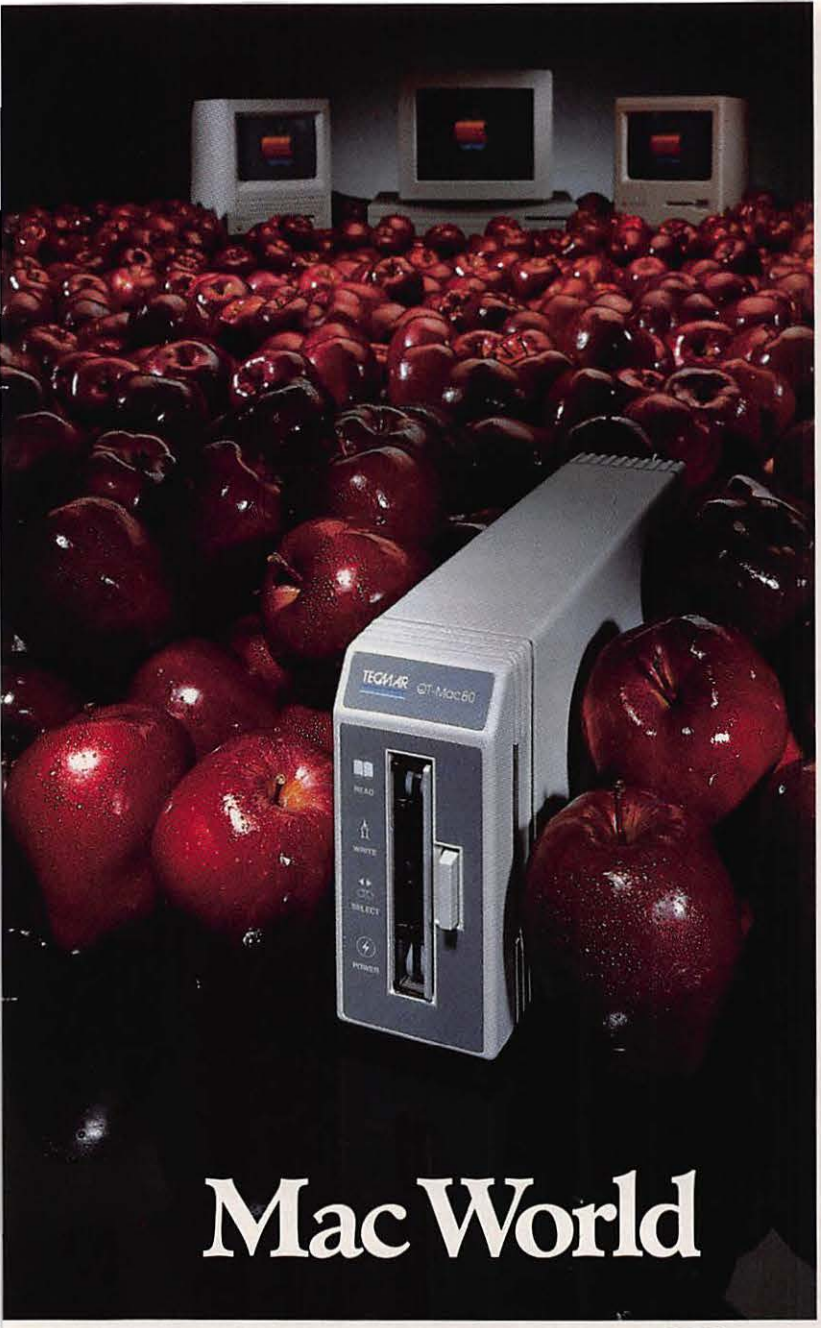
Copying files to the APL-800WD is a bit faster than copying files to an 800K disk. Copying one application from a WORM drive took 23 seconds, versus 35 seconds for copying from an 800K disk. That same application took 11 seconds to launch both from the WORM cartridge and from the 800K disk—as opposed to 4 seconds from the hard disk. The more files a folder contains, the longer it takes to copy. A 74-file folder of 5304K took 4 minutes and 16 seconds to copy; on the other hand, a 438-file folder of 6251K took 9 minutes and 25 seconds.

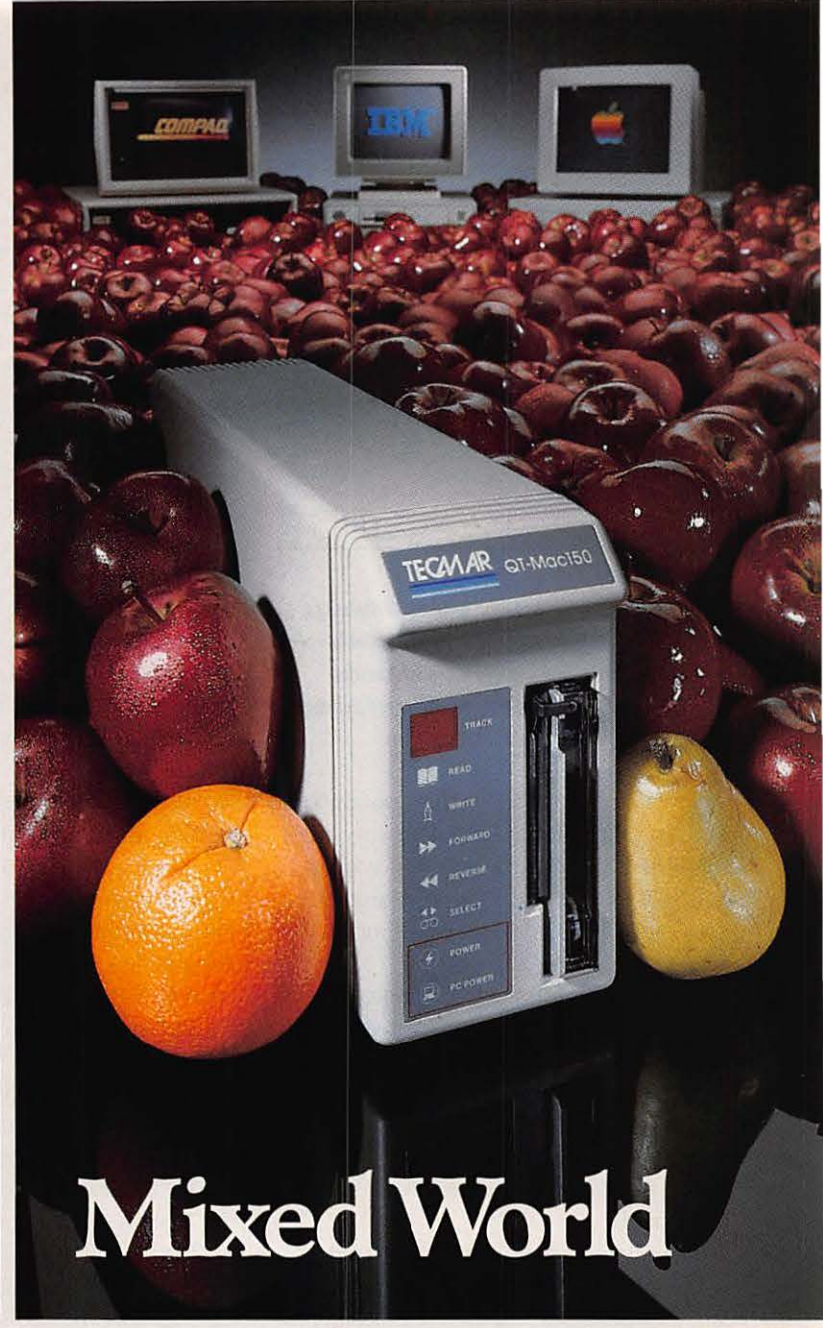
The APL-800WD's ability to create removable cartridges of permanent data is definitely a plus. WORM media are expected to last over ten years—longer than the estimated seven years for the Syquest media used in Mass Microsystems and Peripheral Land removable hard disks. The storage capacity of 800MB per cartridge—at ADIC's prices for one cartridge,

(continues)



The 5¼-by-10½-by-14½-inch APL-800WD weighs 122 pounds.





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	Plus	SE	II	IIX	PC	PS/2™
QT-Mac40 40MB SCSI	●	●	●	●		
QT-Mac80 80MB SCSI		●	●	●		
QT-Mac150* 150MB			●	●	●	●
NuLink Interface			●	●		

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that's about 19 cents per MB—is pretty overwhelming. And the fact that these cartridges are removable may make the security-conscious happy.

Besides its incompatibilities with System 6.0, WriteImage can't perform incremental backups, as many tape drives can. Every time you back up to the WORM disk, you back up the entire disk, and the larger the hard disk—full or not—the longer that will take. If you're looking for a backup device, ADIC's APL-800WD with WriteImage is probably not your best choice.

But if you need an easy way to archive data, and you want the ability to retrieve old versions of data, you have much more reason to look at the APL-800WD.
—Brita Meng

A WELL-ROUNDED COLLECTION

Copy II Mac 7.2

Pros: *Easy method to repair damaged disks; Locate DA allows for string searches within files.*
Cons: *Upgrade price of $18 is high (45 percent of list).*
Company: *Central Point.*
Requires: *Mac 512K.*
List price: *$39.95.*

Version 7.2 of Central Point's Copy II Mac is a collection of three utility programs and a new desk accessory, with improvements that make an already popular program even better. It still enables you to make backup copies of your software (copyright law lets owners of a program make copies to use in the event that the original disk no longer functions), and its new features make it a useful disk-maintenance-and-repair package as well.

A Full Bag of Tricks

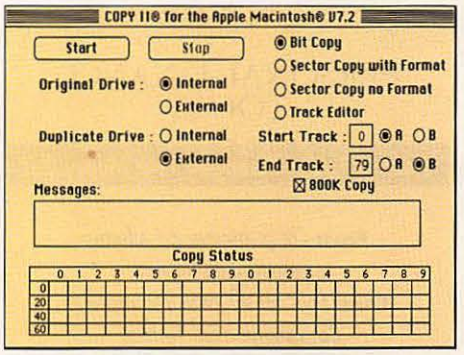
When the main Copy II Mac application opens you see the main window (see "Copy II Mac at Work"). For all nonprotected software, and even for some that is protected, it's simply a matter of selecting the source and destination drives, indicating the type of copy needed (get that information from the included list) and the format of your drives, and clicking on the Start button. Note that the program can handle both 400K and 800K copies, and works on one- and two-drive systems. Copy II Mac now also includes a Track Editor that enables you to find and examine copy-protected sectors, and to perform disk repairs in addition to those the program does automatically.

Hard Disk Support

Copy II Hard Disk is a companion program that transfers all application and data files from the original to a hard disk, RAM disk, or 800K Hierarchical File System (HFS) disk—with the exception of files contained within the System Folder on a protected floppy. There aren't options to choose from; you just tell the computer where to save the copy.

MacTools

MacTools, the third main application in the Copy II Mac package, includes three methods for recovering accidentally deleted files and will indicate the most effective one for your selected disk. The Delete Tracking method works with any HFS disk, including hard disks, but requires you to have installed a Delete Tracking INIT in your System Folder prior to any accidents. This INIT keeps track of your file deletions and retains the essential recovery information in a file for later use. The Tag Recovery method works on 3½-inch disks. It works and retains the essential recovery information in a file for later use. The Tag Recovery method works on 3½-inch disks, but it is not supported by most hard disks. It works by reading the file's tag—a few bytes of information attached to each block on a disk that describe which part of which file the block belongs to. Tags written with 128K ROMs (the kind all Macs have had since the Plus) are unreliable, however, and MacTools provides the CPS Tagfix INIT to make sure that all files written to the disk have correct and reliable tags—though once again, foresight is necessary. The last option, the Resource Fork method, is new to version 7.2 and recovers files by reading the resource fork blocks on a disk. Some files



Copy II Mac at Work
You simply click on a few buttons, using information from the Backup List, to complete the copy operation easily and quickly.

or disks with destroyed directory information can still be recovered this way, although since the directory is missing, the program must guess where the rest of the data is stored.

In addition to file recovery, MacTools provides functions to copy, rename, delete, and verify files, and to format disks, print catalogs, and repair damaged information. The Tree Display in MacTools shows the disk catalog in a tree format, rather than using the standard folder and file icons. This kind of display makes it easier to visualize the structure of the disk.

Locate It

Locate, a new desk accessory included in Copy II Mac, is similar in function to Apple's Find File, but it offers many more options. You install Locate in your System file using Font/DA Mover, or use it in conjunction with one of the resource manager utilities now available. I have been running Locate under Suitcase II with no problems. In addition to searching for a full or partial file name, Locate will also search up to three full or partial strings within a file. This string-search capability, and subsequent display of the information found, can be helpful when you're looking for that reference to what's-his-name that you know is on the disk somewhere.

All in all, this package is easy to use, fast, and versatile, and it's suitable for novice and expert alike. It's a well-rounded collection of useful disk utilities that no Macintosh user should be without.
—John Gillett

PERSONAL-FINANCE TOOLS

Andrew Tobias Managing Your Money 2.0

Pros: *Comprehensive and effective; excellent documentation.*
Cons: *Does not adhere to Mac interface.*
Company: *Meca Ventures.*
Requires: *Mac Plus; second disk drive.*
List price: *$219.*

Andrew Tobias Managing Your Money (MYM for short) approaches the subject of personal financial management with a light touch. For instance, the documentation contains such phrases as "With toasters, it's silly to send in a registration card. With software, it's silly not to." This approach carries through into the program and the help screens. A shining light bulb icon in the main screen, when clicked, gives a "wit and wisdom" quotation of the day concerning money management.

But don't get the impression that MYM is merely entertaining, for it does indeed provide a comprehensive set of excellent management tools for serious money managers.

MYM versus the Competition

MYM is priced just above its two main rivals: Dollars and Sense, and MacMoney. Like them, it lets you write checks, track your finances by category, and view or print financial reports. MYM, however, goes much further. It keeps track of all your investments and securities, guides you in purchasing insurance, and even gives you a good approximation of your taxes, allowing you to fill in simulated tax forms. MYM also tracks any profit or loss you made in the stock market (you manually key changes in the stock prices), guides you through retirement planning, and even reminds you of birthdays and special occasions.

MYM Meets the Mac Interface

MYM's only weakness is that its interface resembles a prerelease version of an IBM Windows-like program that can't decide exactly which way it wants to go, so it goes off in every direction at once.

The main screen consists of a palette with boxed icons for various functions such as writing checks, updating stock prices, and estimating taxes. The top menu bar duplicates these functions, as well as adding others not available from the palette, such as preparing a budget or viewing the various reports. The Help and Exit Program buttons are at the bottom of the Home Card.

The interface doesn't detract obtrusively from the program (although it doesn't add anything either), and accessing the various segments is for the most part a simple process. The transaction forms (checks and deposits, for example) are adequate, although you have to move around the screen a lot to enter the necessary information. The check-writing and deposit screens in Dollars and Sense and MacMoney are more compact and easier to use.

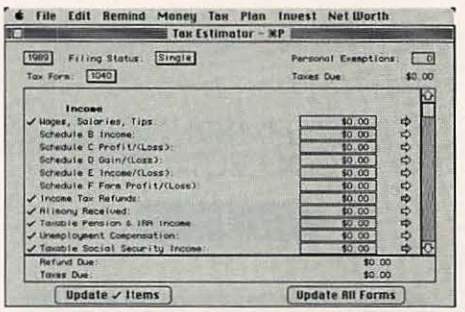
Using MYM

Despite an unimpressive interface, the program is fairly direct and easy to learn. After you define your categories (such as assets, liabilities, and so on) from the Net Worth menu, you will spend most of your time in the Spend Money and Receive Money segments of the program. After you enter your transactions, you can print checks on an ImageWriter II or ImageWriter LQ printer. Printing checks was a problem in the earlier version, but it has been fixed in version 2.0. You should, however, use the commercial checks designed for the program.

The Tax Estimator provides you with a federal 1040 form to complete and enables you to access other available forms, complete them, and end up with a good approximation of your federal tax bill. State and local taxes are estimated through generic worksheets.

You access reports from the top menu bar, and the documentation spells out specifically which menus lead to which reports. For example, you can analyze Actuals versus Budget and Income versus Expense under the Money menu; you can handle investment analyses through the Invest menu; and you select analyses of your net worth, assets, and liabilities from the Net Worth menu (where you defined your categories). Reports and analyses are available in both text and graphic form.

I particularly liked MYM's attention to the small details that you hardly notice but that can be annoying when they aren't there. For example, MYM, like Dollars and Sense, allows you to take shortcuts in entering expense categories. In MacMoney, when you enter a category for charging a check (for example, Auto Loan), you must type the first few letters and press ⌘-F to search for the category. In MYM you can type a few letters of the category name (Auto) and press Enter. The program then enters the nearest category name, which saves time when you are entering a lot of data.



Estimating Your Taxes
A sample of the tax forms you complete when estimating your taxes in Managing Your Money. The program provides an extensive Tax Estimating segment, although it will not give the accurate, to-the-penny results you get from a dedicated tax-preparation program.

Meca Software offers two levels of support. The standard (free) level offers the usual 90-day warranty, notification of updates, and unlimited customer service. The Plus Plan ($49.95 per year) supplements this with one free program update, newsletters from the author, and damaged-disk replacement coverage for 12 months.

My total impression of Managing Your Money is favorable, despite the interface shortcomings. If you're looking for a personal (or small-business) financial program that will go beyond the basics of writing checks and tracking income and expense, Managing Your Money might be for you. —*Alan L. Slay*

WARNING!

Tetris and Solitaire Royale Designated Addictive.



TETRIS

Can you play just one game? The general consensus is "NO!" Spectrum HoloByte™ has inadvertently contributed to the decline of American productivity by releasing the Russian "virus" called TETRIS™. And the addiction is spreading. Industry experts speak out on the dilemma.

"Tetris is at once relaxing, challenging, frustrating, and—yes, I have to use this word again—addictive."
Editor's Choice, inCider Magazine.

Games of '88: Tetris "...year's outstanding recreational software product." ***Arnie Katz, MACazine.***

Game of the Year: Tetris "as simple as the game is to learn, it is impossible to master."
Home Office Computing.

Choice Awards 1989, Best Arcade Game: Tetris "People say this about lots of games, but Tetris is, by far, the most addictive game ever." ***Compute.***

Year's Best Computer Games, Best Action Strategy: Tetris "The addictiveness of Tetris cannot be overstated."
Video Games & Computer Entertainment.

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"The games are addicting, and you're likely to waste more than 10 minutes trying to win just one more game."
William Harwood, United Press International.

"We found ourselves playing game after game, unable to get up...and then sneaking back to the computer room late at night for 'just one more round.'"
Computer Entertainer.

"Now I'm addicted to Solitaire Royale. The program has introduced me to several new solitaire challenges I would never have tried before." Rated 5 (Excellent-5 possible).
Alan R. Bechtold, Info-Mat Magazine Weekly.

Solitaire Royale rated 9.50 (Excellent-10 possible).
Computer Play.

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A NU APPROACH

NuPaint 1.0

Pros: *Powerful Shadow tool; permits patterns up to 32-by-32 pixels; inexpensive.*
Cons: *Slightly buggy; some new tools non-intuitive and difficult to use.*
Company: *NuEquation.*
Requires: *Mac 512KE.*
List price: *$139.95.*

A lot has happened to Macintosh graphics since the seductive MacPaint sold thousands of Macs in 1984. MacDraw, for example. And color. And laser printers, scanners, and PostScript programs, all of which vastly improve the 72-dots-per-inch dot matrix output of MacPaint.

Despite the advent of these professional tools, there's still a lot to be said for paint (bitmapped graphics) programs. For one thing, there are over a million monochrome Macs out there that have no use for color, and a lot of dot matrix printers that don't benefit from PostScript or object-oriented graphics. Then, too, paint programs are simple to learn and master: the tools are always available, and you can usually skip the manual.

For these reasons, we're seeing the introduction of one third-generation paint program after another. Each maintains the interface, keyboard shortcuts, and simplicity of MacPaint yet claims to offer dramatic improvements and new features. The latest example is NuPaint, the first Macintosh program from a tiny company called NuEquation.



Nu FX

A sampler of special tools in NuPaint: the Trowel tool smoothed the jaggies of the enlarged word Mac. The Shadow command created the shadow, in a user-defined choice of pattern, angle, and overlay mode. In the bottom row, the word Mac shows the results of successive passes with the Mixing Bowl tool.

Pretty as a Pixel

Like most of the new paint programs, NuPaint's primary ingredient is MacPaint. There are, naturally, some new features. By far the most ingenious and useful is the Shadow menu command, which cleanly and simply creates a shadow falling from whatever object you've selected with the Marquee (see "Nu FX"). It takes a minute for the Mac to compute this effect, but the results can be good enough to make you wish that every graphics program included this feature.

NuPaint's palette contains three tools you won't recognize: a Trowel, a Mixing Bowl, and a Razor. The Mixing Bowl works like the Charcoal in DeskPaint or Cricket Paint: as you drag it over an image, the black areas get smudged, creating softer edges for a fuzzier, more out-of-focus look. If you're not careful, you can Mixing-Bowl an object into near-illegibility, which is ideal, of course, if you're into subliminal advertising.

The Trowel and the Razor are terrific ideas that have been disappointingly executed. In theory, you can drag either of these tools over the jagged edges of an object, and it will shave off any stray pixels, resulting in a smoother outline. Unfortunately, neither tool works very well. To begin with, they're extremely similar; after weeks of working with NuPaint, I still hadn't quite figured out how they differ. It takes practice and a couple of phone calls to the company before you get the hang of using these tools: you have to attack the image perpendicular to its edge. You can't just shave along the length of an object; if you're trying to de-fuzz a 4-inch line, you have to stroke it with the 1/4-inch-long Trowel tool 16 times.

A Discerning Palette

NuPaint's Pattern palette contains its other innovations. One outstanding feature, 32-pixel patterns, should be a must for all paint programs. The standard MacPaint pattern is an 8-by-8-pixel grid repeated endlessly. Although you can edit the arrangement of those 64 dots in any paint program, NuPaint adds some intriguing options: you can change the size of the grid to 16 by 16 pixels, or even 32 by 32, which is large enough for drawing small pictures, words, or logos, which can then be painted with the Paintbrush, sprayed with the Spray Can, or used to fill a polygon.

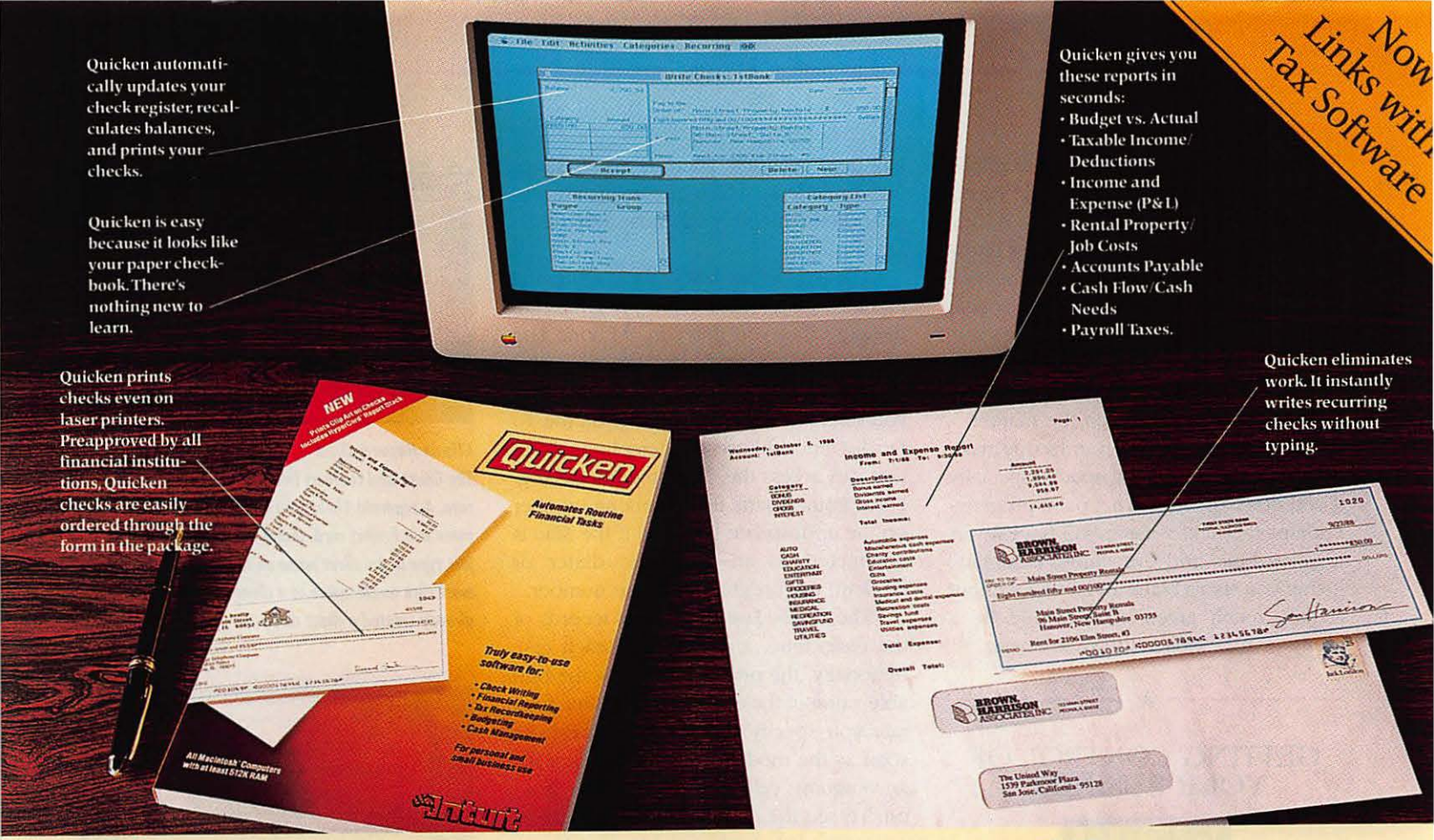
NuPaint provides a tool within the Pattern palette called the Artist palette. Its sole purpose is to capture any existing image on the screen for the Pattern palette; thus, if you've painstakingly drawn one exquisitely darling hamster, you have but to zap it into the palette and suddenly the Paintbrush can be used to smear smiling rodents all over the screen.

Because NuPaint's patterns can be larger and more complex than the simple lines-and-bricks of most paint programs', the default palette of 162 patterns contains far more interesting choices. They range from the clever (a chunk of braided rope, which can be as long as you like) to the cloying (tiny smiley faces and I ❤ You's). The point is, however, that the power of the Pattern palette can no longer be taken for granted; in NuPaint, it becomes a tool of its own, useful for storing banks of often-used elements or creating especially complex shadings—so long as they will fit into a 32-by-32-dot grid.

So What's Nu?

There is, of course, a wish list for NuPaint. The program lacks the layering power of SuperPaint or Canvas 2.0 (or even the magic eraser of MacPaint 2.0). You will also miss the ability to enter a full-screen enlarged-view mode (if you want to zoom in with NuPaint, you must work in one half of a split screen). You may even wish that the Rotate, Distort, Trace Edges, and other special-effects tools would work on selections made with the lasso, as they do in HyperCard, instead of just with the marquee. Most troublesome of all, however, are NuPaint's bugs. Like any new program, NuPaint suffers from a few oversights. Since the Option key turns the cursor into the grabber hand for moving

(continues)



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the image around on screen, for example, there's no way to type Option-key characters when you're entering text. And if you're zooming in on a part of the drawing, changes you make in the enlarged half of the split screen sometimes appear only in the other half: the actual-size view. Glitches like these would be easier to accept in a program with fewer polished, established competitors on the market.

But NuPaint's ambition and scope make owning it an enticing prospect, especially if you don't already own a paint program. Perhaps the next version will have fewer niggling bugs and even more flexibility, giving you sharp black and white without costing much green. That would be a pretty picture indeed.—*David Pogue*

GETTING CONTROL OF YOUR BUSINESS

Focal Point II 1.0

Pros: *Integrates most aspects of an organization; handles data that doesn't fit comfortably into file managers.*
Cons: *Slow; doesn't display multiple documents on screen; inflexible structure will not work for some organizations.*
Company: *TenPoint0.*
Requires: *Mac Plus; hard disk.*
List price: *$195.95.*

Focal Point II automates paper shuffling by moving data between 17 HyperCard stacks that cover most office record-keeping tasks. The stacks include an Appointment Book, a To Do list, Outgoing and Incoming Phone Logs, Client and Vendor Records, Auto Expense Records, and Time Sheets. The beauty of this program is how well all of the modules are integrated.

The Modules

The Appointment Book module divides the hours from 6 a.m. to 7:30 p.m. into half-hour segments and has a section at the bottom of the page devoted to evening appointments. You can display an alarm message for any appointment entry and set it to go off at any time, even between half-hour sections. There is also a space for reminders, which automatically appear on the Monthly Calendar and the To Do list.

The To Do list links to the Outgoing and Incoming Phone Logs. Any follow-up message that you enter in a Phone Log card can be posted, by selecting Post Follow Up card, on the To Do list. Or, if you select a telephone number on the To Do list and choose the telephone icon, you can access the Outgoing Phone Log. Focal Point inserts the telephone number on the appropriate line, and if the Mac is connected to an automatic dialer or modem, the program dials the number.

The Phone Log cards keep records of the date, time, and length of each call; optionally, the program can post the billable value of the elapsed phone time (at a rate you specify) on the Client card. As soon as the modem dials the number for an outgoing call, the hidden timer goes on. To see the current length of a call in progress, click the Elapsed button. If you want to reset the timer, you can click the Restart button. To end a call click the Check Mark button—Focal Point II stops the timer, displays the length of the call, fills in the time the call ended on the Phone Log, and hangs up the modem. The name and phone number on a Phone Log card can be posted in the Directory stack; from there they can be used for the heading of a memo in the Note stack or for electronic mail transmittals in the Mail stack. On a local area network, Focal Point II can receive and send electronic messages. You can also use Task Master to assign and organize tasks to delegate subtasks to other people.

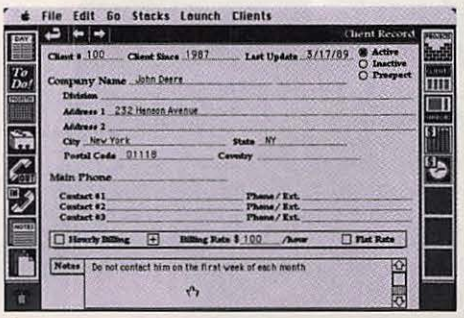
Focal Point II lets you export any information in its cards as text. You can also import data from the HyperCard address stack into Focal Point's Directory stack.

Focal Point II comes with a special report-printing capability. For example, you can print the Appointment Book stack in Day-at-a-Glance or Week-at-a-Glance format and in junior-pocket, senior-pocket, or desktop size.

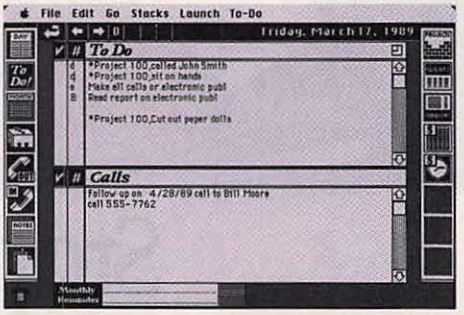
Project Management

Most activities in Focal Point II are related to projects. The Project card contains the name and number of the project, name and address of the client, proposed and actual expenses, start and due dates, total amount invoiced, total amount received, balance due, and miscellaneous notes. This card is connected to ten subcards that can be accessed from the Zoom button. There is a subcard for entering project specifications, and there are spreadsheetlike subcards that calculate the estimated and actual labor, materials, and expenses and then post the totals on the Project card. Each of these cost items can be printed on an itemized invoice. Once the invoice is printed, a check mark is placed next to each billed item on the Project card, and a new Invoiced to Date amount is calculated and posted.

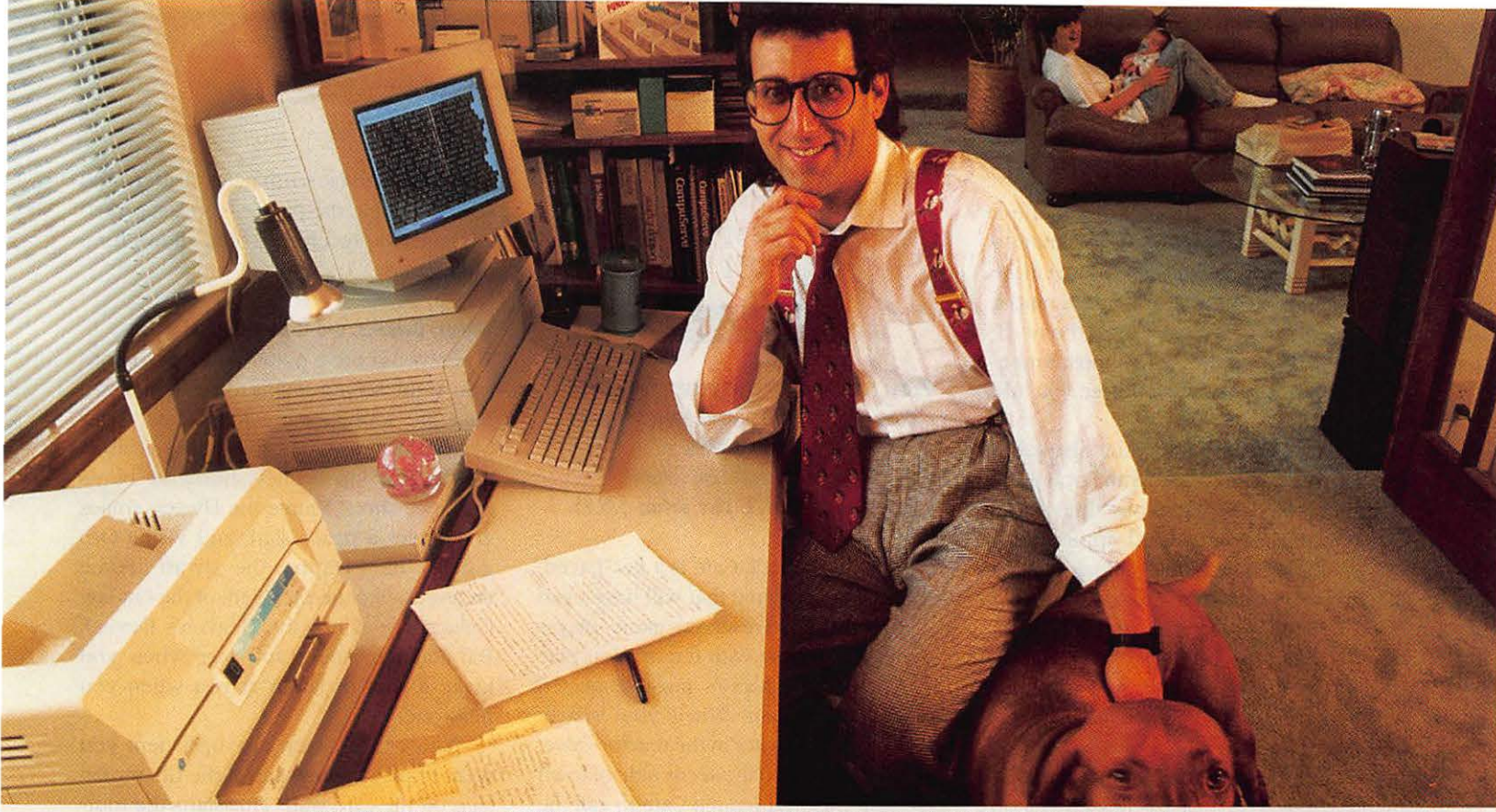
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Client Record Card
The Client card contains information, including billing rate. A separate Client card is required for each client name in a Project card. (Focal Point will not let you just type in the client name on the Project card; you must click on the name of a client for whom you have already created a client card.)



Automated To Do List
Focal Point II's To Do list is completely automated and is tied into six other cards. When you have a note—on any card in Focal Point II—to do something such as return a phone call or supervise a task, you can transfer that note to the To Do list. All unchecked To Do items automatically carry over to the next day.



Bob LeVitus, former editor of MACazine; author of Dr. Macintosh: Tips, Techniques, and Advice for Mastering Your Macintosh.

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Circle 102 on reader service card

The Problems

Although HyperCard is an excellent medium for organizing the disparate chunks of data that run an organization, it's slow, it uses a lot of disk space, and it can often be awkward. Focal Point II, along with HyperCard, uses almost 3 megabytes of disk space even before you add data.

Every operation procedure also takes seconds—even minutes—with Focal Point II, rather than the split-second times associated with non-HyperCard applications. For example, what looks like a row of Macintosh pull-down menus on the top of Focal Point II's screen is actually a collection of HyperCard buttons. On an SE, you must hold down the mouse button for about three seconds before a menu drops, and you can't run the mouse over the menu names to get a quick peek at all the menu items—you have to click one menu at a time. To create six months worth of blank Appointment Book, Calendar, and To Do cards takes about 12 minutes. And, because there is no windowing capability, you can't see—let alone copy and paste to and from—multiple documents.

Another problem with Focal Point II is that while the program does a good job of organizing the paper flow in a business, it takes a heavy hand in deciding how a business should run. For example, travel expenses for each trip are listed on individual cards that are linked to projects and clients. That works great if you don't do a lot of travel and want to keep careful records of each trip. But a salesperson who makes 15 calls a day to 15 customers might prefer to itemize all calls on one card rather than fill out a separate card for each customer. Nor can you write a quick estimate or bill on the Project card, because all entries have to be done through a myriad of subcards.

If your business is tightly structured and you don't want to change, you might opt not to use many of Focal Point II's modules. On the other hand, the structure the program provides is well thought out and if followed, can probably improve most organizations. So if you're willing to make some accommodations, Focal Point II can help get your business under control.—*Lawrence Stevens*

STRANDED ON PLANET OZ?

Shufflepuck Cafe 1.0

Pros: *Easy to learn; fluid progression through levels.*
Cons: *No color; no options for two-player game; key disk required.*
Company: *Brøderbund Software.*
Requires: *Mac 512K.* ***List price:*** *$39.95.*

Shufflepuck Cafe is a fast-paced, intense game that will have even the most reserved game player pushing the mouse with fervor. You play the part of the galaxy's most respected Krypton-3 salesman. When your spaceship blows a capacitor in the reactor valve, you have to land on the seedy side of town and enter the Shufflepuck Cafe to call the repair sled. But the café regulars won't let you leave until you have defeated each of the eight galactic misfits at the Shufflepuck board; each creature has its own peculiarities and playing style.

In the game two players shoot the puck across a court using paddles. The point of the game is to block the opponent's puck. A point is scored by getting the puck past the paddle. The Shufflepuck table and style of play resemble computer air hockey, especially air hockey's speed and the way you can angle shots to score. Unlike air hockey, however, Shufflepuck has no specific goal area; to score, opponents must get the puck past each other. The game starts when one of the two players serves the puck, and it ends when one of them makes 15 points. You alternate who serves so that no matter who scores a point, the player who last served becomes the receiver, which allows for a fluid game.



The Shufflepuck Cafe
You select your opponent and begin a game by clicking on one of the occupants of the café.

Wimps, Dweebs, and Orbs—Oh My!

When you score a point, your opponent's side of the screen seems to crack and you hear the sound of breaking glass. Your opponent's reactions are unpredictable: the wimp, Skip Feeney, hurriedly blurts out "nice shot," Vinnie the Dweeb smiles and waves a peace sign, and Visine Orb giggles like Happy the dwarf. Some creatures, like the president of the Outlaw Galacticycle Club (the Heaven's Devils), Biff Raunch, sneer and jeer when you make a shot or laugh at you when you miss one.

You can click on any opponent you want to play against, or on the Champion sign on the café wall. This starts the tournament in which the game matches you against each of the eight players successively. During the bar scene you hear digitized background bar noise, including a catchy song.

Once you choose an opponent, the bar scene dissolves into the main game screen showing you the Shufflepuck court with your opponent sitting at the opposite end.

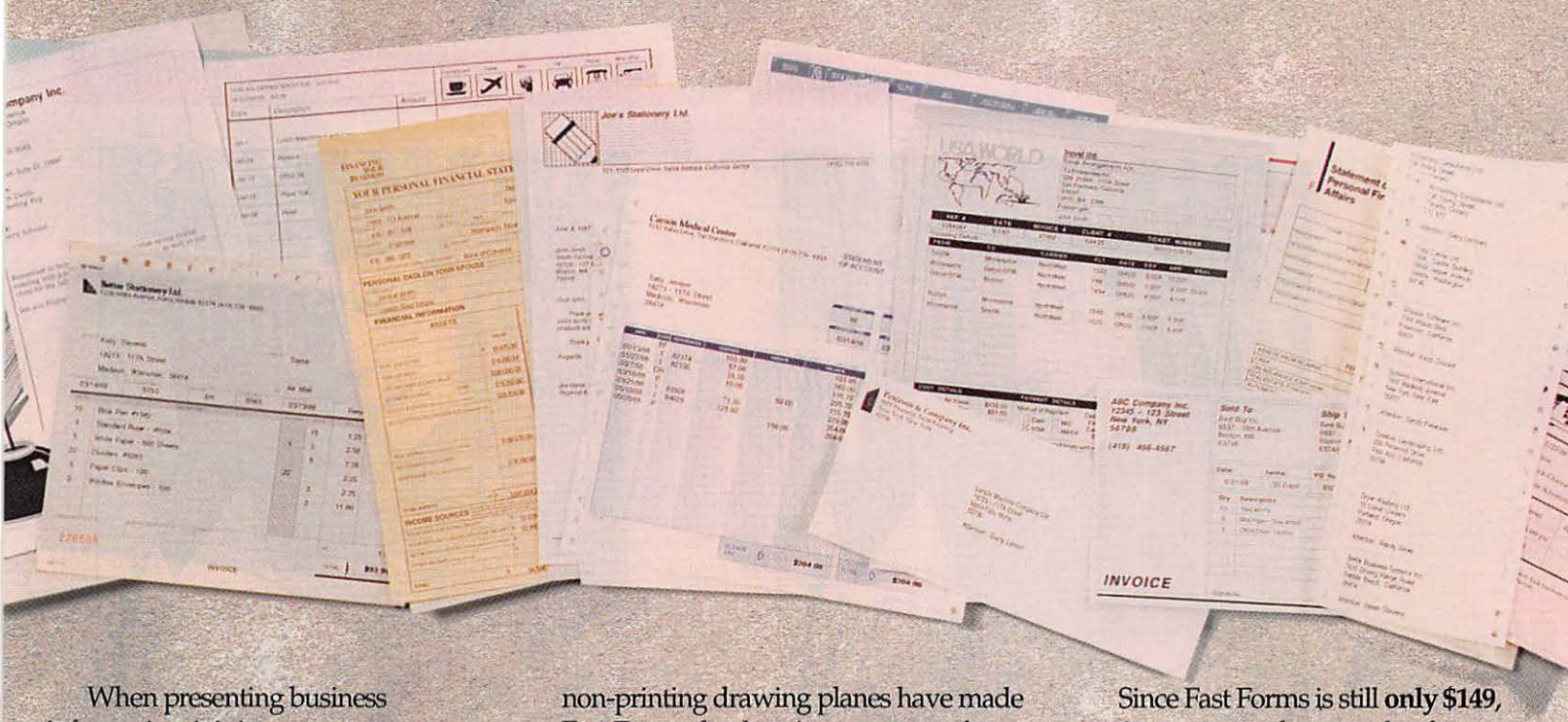
You may want to start out playing against the training robot, whose playing ability you can adjust, using the Droid menu, to mimic some of the opponents you will meet later. The robot also lets you adjust the sideways bounce, the forward bounce, and sideways and forward power. The Droid menu includes all these options, allowing you to vary the way your paddle reacts. In tournament play, holding the mouse button down enables you to make tennislike volleys.

There's a lot of attention to detail in this game. For instance, some of your opponents will follow the puck with their eyes, adding realism to the game. When a point is scored, a robot arm appears out of the corner of the screen and tallies the point on the blackboard. Some opponents are great servers, some are great at defense, some are great at offense, and a few are great at all three.

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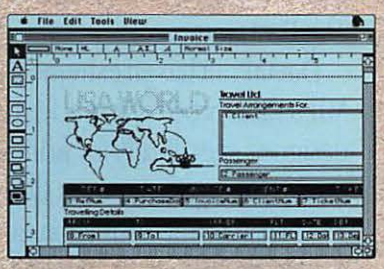
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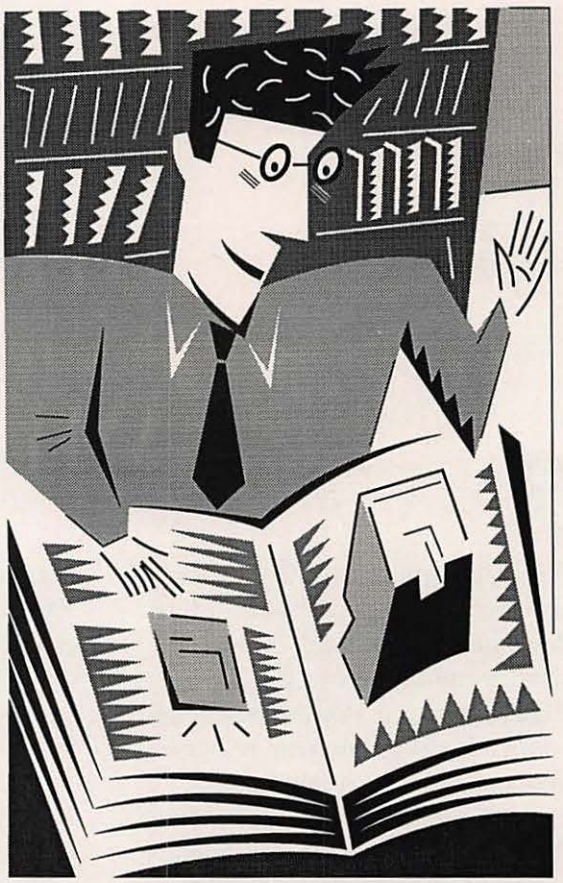
Circle 297 on reader service card

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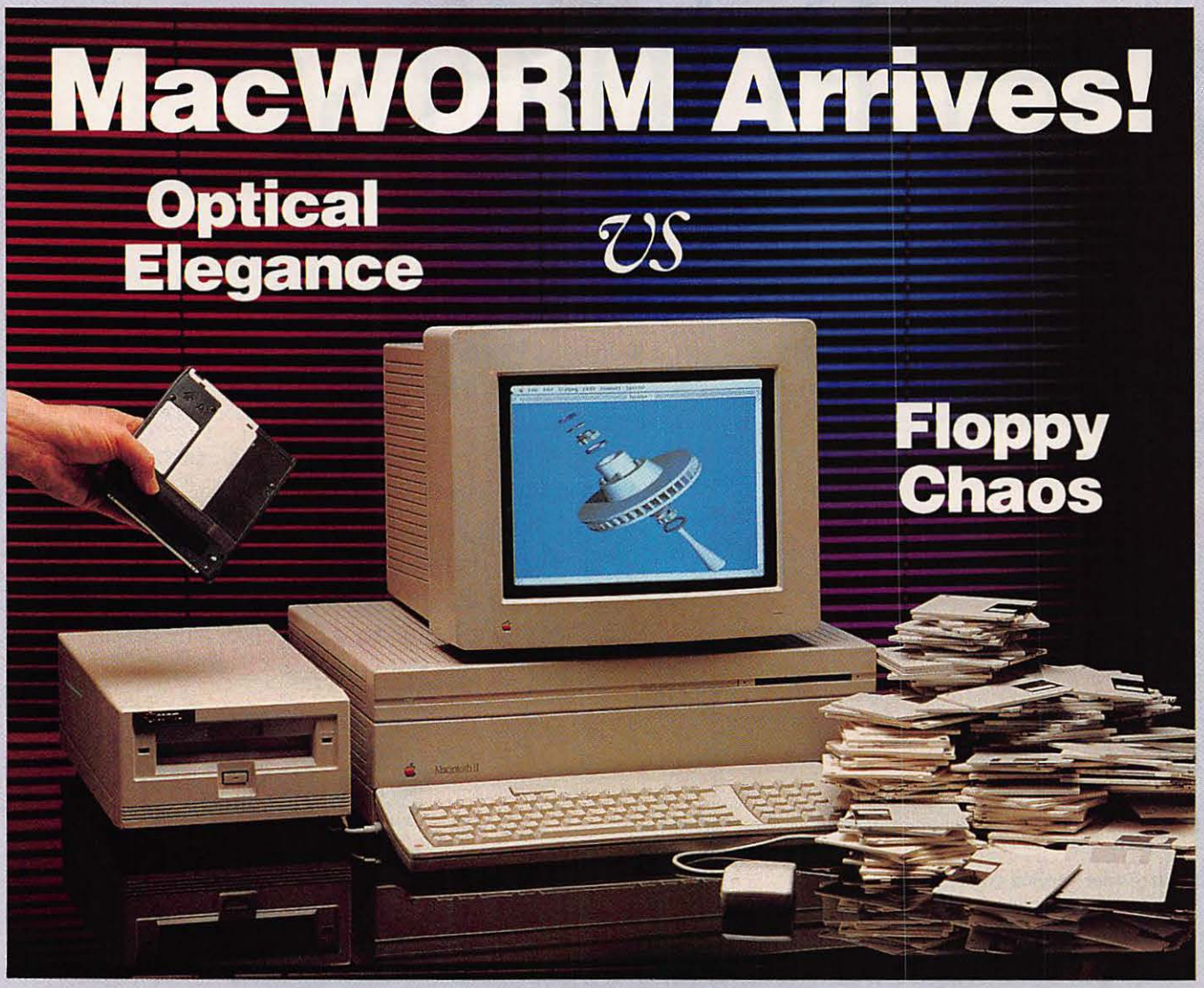
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	Cartridges	$115
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Circle 233 on reader service card

If you really want a challenge, you can add a *blocker*—a rectangular obstacle that traverses the middle of the board—to the game. When the blocker is hit, it moves from side to side—the speed of its motion depends on the velocity and the angle of impact. You can customize the size and weight of the blocker.

When you use Shufflepuck Cafe on a Mac II, the game screen sits in the center of the monitor; it's the same size as a Plus or SE screen. Play on the Mac II seems a little quicker than on the Plus or SE, however, due to the Mac II's faster processor. Adding color to the Mac II version would have added life to the characters and enhanced the game.

The authors have done an excellent job of making Shufflepuck Cafe challenging and fun, but I would like the option to network and play against a friend. Shufflepuck Cafe is incredibly fun, fast, and furious. It has a great cast of characters with comical, and sometimes maddening, expressions and digitized sounds.

—*David J. Rudolph*

FAST TAPE BACKUP

Irwin Backup 5080 Tape Drive

Pros: *Fast backup and scheduling software; compatible with Irwin PC drive.*
Cons: *Proprietary format.*
Company: *Irwin Magnetics.*
Requires: *Mac Plus.*
List price: *$1695.*

Irwin's Backup 5080 SCSI-interface tape drive is an effective, flexible backup system targeted at both networked and non-networked environments where large amounts of data need to be backed up or routinely moved between any combination of PCs and Macs. Although the 5080 uses a format that is radically different from the proposed QIC-100 standard, it offers some technical and administrative advantages.

Networks and Non-networks

Irwin offers both network and non-network alternatives to data sharing between PCs and Macs. In an Apple-only environment where various manufacturers' drives are used, Irwin's lack of support for the QIC-100 format is a real drawback. But as the original manufacturer of the tape drives in IBM, Compaq, Olivetti, and Zenith computers, as well as a major vendor of external tape drives for PCs, Irwin is not targeting the Mac-only office. Irwin drives can be used to back up machines on or off 3Com and Novell Ethernet, Novell Netware, AppleShare, and TOPS networks. Assuming that the programs being used have already settled the file conversion problems, files can be transferred via tape between Macs and PCs.


MARK JOHANN

The Irwin Backup 5080 is designed to look like a 3-inch extension of a Mac II.

The menus and commands of the back-up and restore features of Irwin's PC EzTape 2.0 and Mac EzTape 1.1 are straightforward, whether or not you know anything about tape drives, data retrieval, head positioning, and the other nitty gritty technology of backup devices. EzTape backup strategies include mirror (or volume) and file-by-file backup. It offers password protection, and you can define backup sets with parameter files and configure preferences and criteria for incremental backups. Regardless of the size of the drive you are backing up, the tape program adds backup sets to the tape instead of overwriting them so that multiple sets and sessions can be sequentially stored and restored.

EzTape doesn't bog down an AppleShare network. Provided the person backing up the network in AppleShare is a member of every group, with permission to see folders and files, the entire network can be backed up without shutting it down. If access privileges are not available to the person performing the backup, AppleShare messages painstakingly report denied access. Files in use are locked out of the backup set. And EzTape is the only currently available tape-backup software that saves all access privileges in the backup set.

Backing up over LocalTalk takes more time than direct SCSI connection to a single station because of the laborious transfer rate. A 2.9MB folder I backed up on a single-user station took about 2 minutes; over LocalTalk it took 22 minutes. Multiply that out, and you can immediately appreciate the EzStart scheduling option for unattended backup, especially for large servers.

The only real criticism of the EzTape software I have is with the status indicator. Instead of revealing in absolute minutes how long a backup or restore will take, the indicator only shows you what percent of the job is finished, with no reference to real time.

A Formidable Format

Irwin's proprietary format is a case where using different standards makes sense. Even though the Backup 5080 uses the same cartridge as drives that follow Apple's QIC-100 format, its nonstandard format both increases the amount of data that can be stored on a single tape and dramatically reduces the time it takes to store it. Irwin enhanced the drive's reliability through the company's Accutrak technology, which offsets the alignment variances that plague all tape cartridge and floppy disk drives.

Simple Installation in Any Environment

Installation simply involves plugging in the power and interface cables, verifying that the SCSI address does not conflict with any other SCSI devices present (and if it does, easily adjusting the rotary switch on the back), and placing the EzTape software in the System Folder. When faced with the two to three hours of formatting time, it is well worth it to pay about $5 more for preformatted 3M DC-2000 or Irwin TC-400 cartridges.

Both the user and installation manuals are well written and easy to understand.

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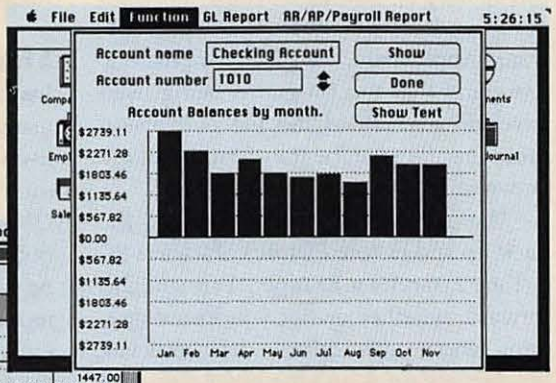
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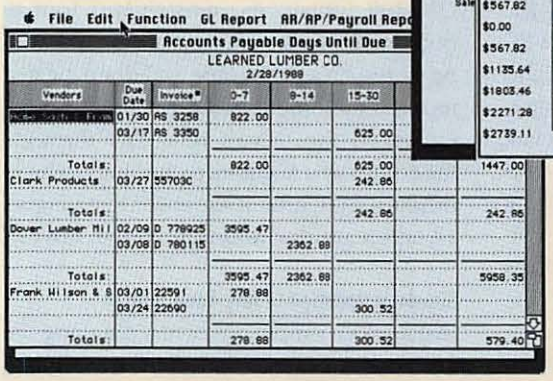
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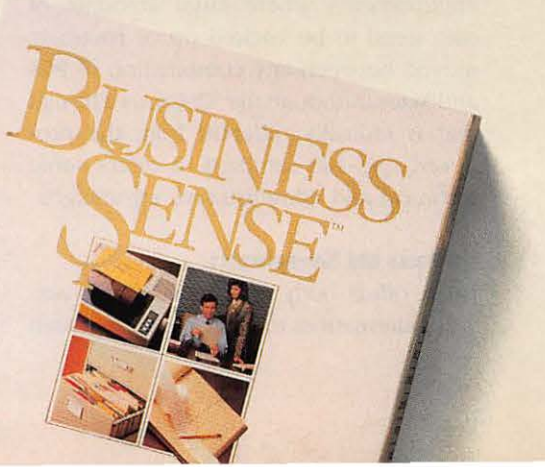
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Circle 87 on reader service card

The former offers specific instruction on how to use the drive, as well as general advice—such as how to clean tape heads and in what order you should turn on and off the various system components. It also includes a section on various backup strategies. If the manual or the diagnostics program doesn't help you solve a specific problem, you can dial an 800 technical support number for more detailed advice.

The main administrative advantage of using Irwin's Backup 5080 with EzTape 1.1 is that you can organize and manage a backup strategy by defining different backup sets, and implement them using the EzStart option. (The 5080 originally shipped with EzTape 1.0, which did not include the EzStart option. Updates will automatically be sent to registered owners.) Although the 5080 is a very serviceable backup device for a single user with at least an 80MB drive, it's more cost-efficient to use it in an integrated Mac-PC environment where other Irwin drives are used.—*Nancy Canning*

NEW HOBBITS FOR OLD

The Hobbit 1.0

The Fellowship of the Ring 1.0

The Shadows of Mordor 1.0

Pros: *Adaptations are literate and faithful in spirit to original books. Fellowship game is particularly intricate.*
Cons: *Old-fashioned computer game feeling.*
Company: *Addison-Wesley.*
Requires: *Mac 512KE.*
List price: *$39.95 each.*



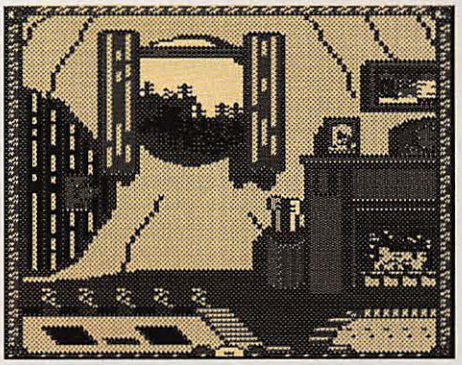
Those who have been enthralled by J. R. R. Tolkien's fantasy classics will be interested in this trio of Macintosh Hobbit games that can also be enjoyed by anyone who has never met a hobbit but has a fancy for well-written text-adventure games. Fans of glitzy graphics will be disappointed by this literal text adaptation. The Hobbit, The Fellowship of the Ring, and The Shadows of Mordor represent the only authorized computer adaptation of Tolkien's Middle Earth. The programming was originally undertaken almost a decade ago, which may explain why these games seem old-fashioned. The first in the series, The Hobbit, is particularly clumsy; it is handicapped by a 400-word input vocabulary. The Fellowship of the Ring actually includes two complete games on one disk. When you successfully complete the first game, your party of adventurers automatically loads into the second game. If you want to start with just one of the three packages, I recommend The Fellowship of the Ring.

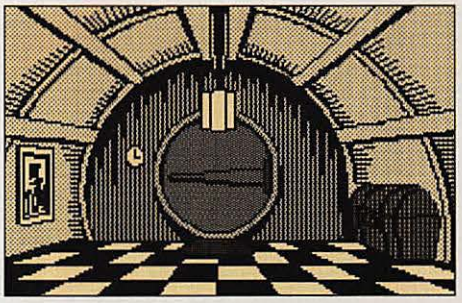
In all three programs, the screen is divided into two windows: a large one for the scrolling text of the story; a smaller window for the player's typed instructions. The most-often-used commands such as Go North can be typed in abbreviated form, for example, N. Each new scene is illustrated in the larger window above the lines of text. In The Hobbit, these black-and-white graphics are excellent, including many good imitations of Tolkien's inspired paintings. In The Fellowship of the Ring and The Shadows of Mordor, however, the art adds little to the games' overall appeal.

For Those Who've Read the Books

These games do not repeat Tolkien's stories. The computer adventure-game's twists and turns, clues, found objects, and mazes are designed with Middle Earth in mind and they deliver the characters through roughly the same passage that the books do. One of the most entertaining aspects of The Fellowship of the Ring and The Shadows of Mordor (if you are entertained by turning these games into your life's work) is that at the outset you can instruct the programs to let you play all the playable characters.

You can play any one of the four different characters (Frodo, Sam, Merry, or Pippin), or any combination in different situations; you can also play the same sequence more than once, using different characters each time; or you can have a second player play one or more of the characters. The Fellowship of the Ring's two games permit four players to play different parts. Players are encouraged to read the Tolkien books and keep them on hand as guides, but they won't provide any specific game solutions. There is, however, a hint section in each game's manual.

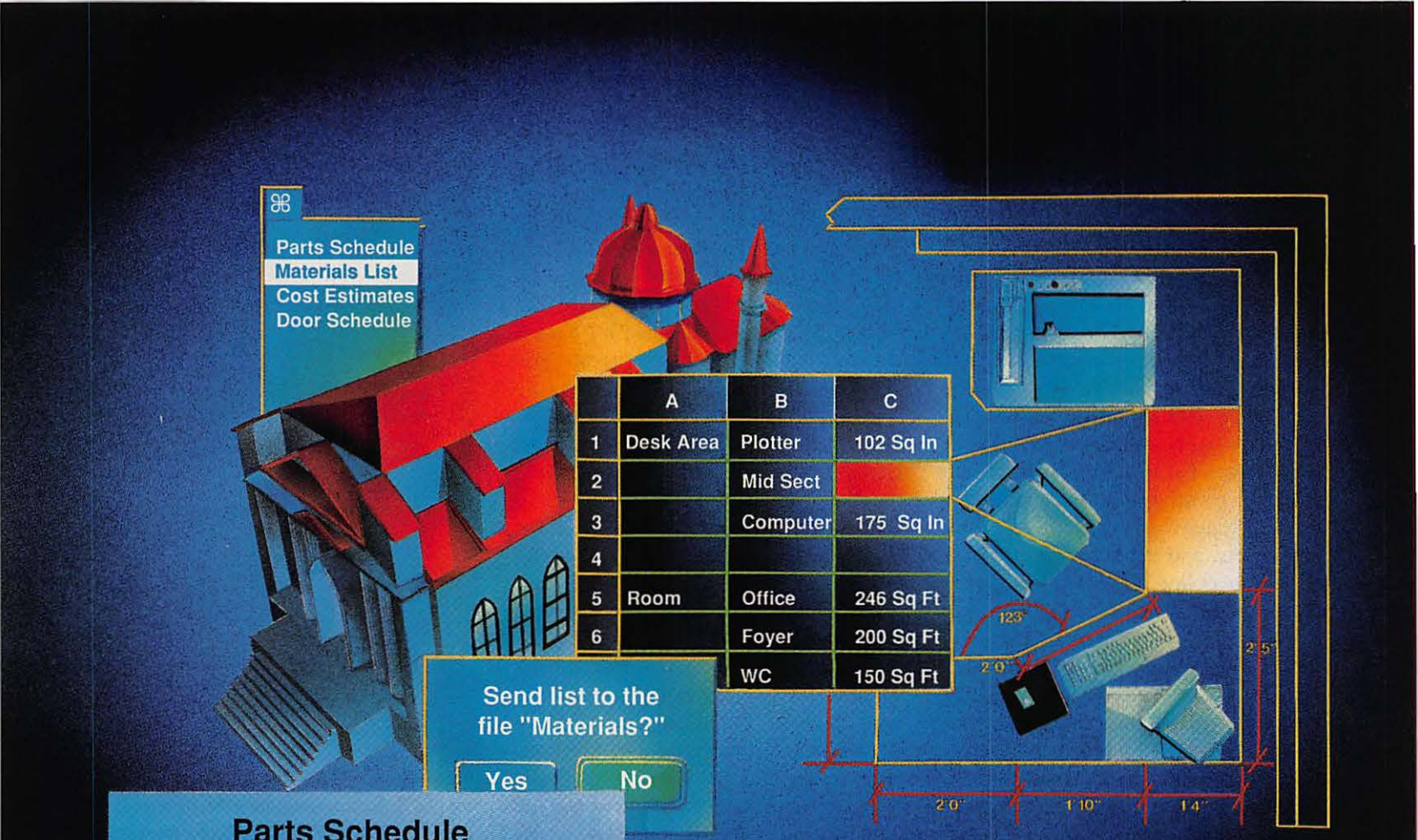


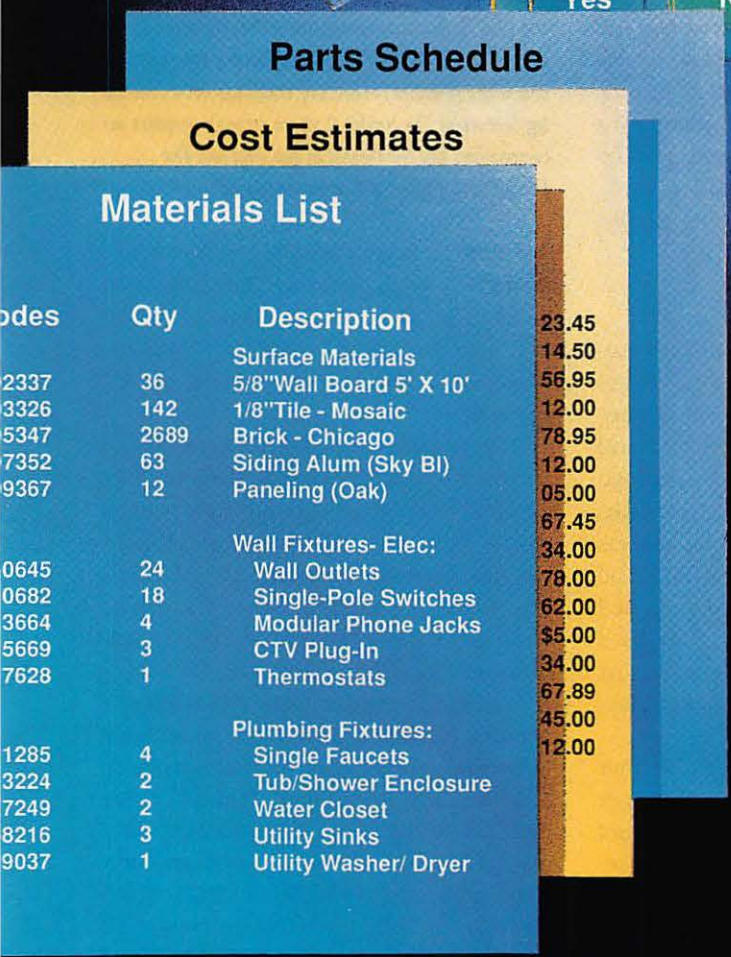


Graphics
The two illustrations demonstrate the difference in the style of art in the Hobbit games. The dramatic black-and-white graphics resembling woodcuts are a redeeming feature of The Hobbit (bottom screen); graphics accompanying The Fellowship of the Ring and The Shadows of Mordor suffer by comparison.

These games, based on literature, invite those who read the books to play, yet they demand that players communicate using a rigidly structured 800-word vocabulary (an illiterate 400 words for The Hobbit). Text games are more fun when you can sit back and easily communicate more complex iterations than "Go North."

Given the rigid nature of the text-adventure format, if you enjoy essentially nonvisual games that require mapping, patience, and persistence, you will enjoy The Fellowship of the Ring and The Shadows of Mordor. All three games are complex, respectful of Tolkien's Middle Earth legends, and will give Tolkien fans of all ages a brain-teasing reunion with some of their favorite characters.
—*Keith McCandless*





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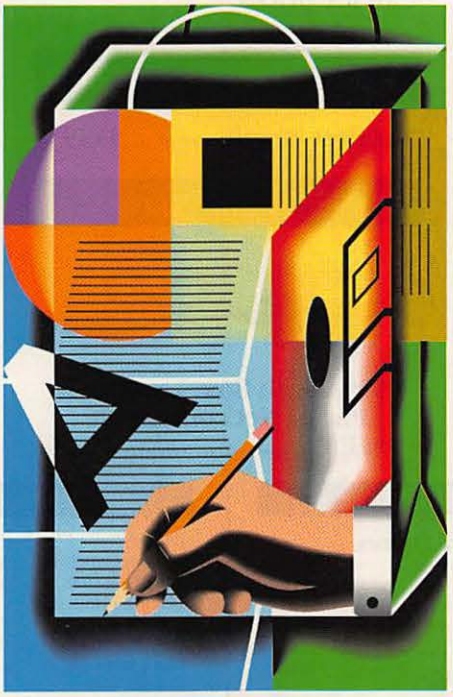
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Circle 77 on reader service card

WINDOW SHOPPING

by Lawrence Stevens

This month we review two commercial stacks—one exemplifies basic, the other advanced HyperCard programming—and Joker Poker and ConvertUnits.


RON CHAN

Hyper Mac Subjects

Hyper Mac Subjects from Pointer Publications is an example of a basic stack that contains useful information. It is a bimonthly subject-and-title index to articles in Macintosh magazines ($50 per year for six issues, or with the Combined Indexes $80 per year for eight issues). The company also publishes a six-month compilation called Hyper Mac Subjects Combined Index ($45 per issue). To use it, you either scroll through the alphabetized subjects in the Index or use HyperCard's Find message to search the Index. When you click on a subject in the Index, you go to a card that displays the titles of articles that discuss the selected subject, along with the magazine title, issue number, and page number.

Hyper Mac Subjects has the advantage of being Mac-specific, and it indexes 24 Mac magazines. Many of the sources, however, are obscure newsletters or trade publications. The online services have the advantage of allowing you to use more sophisticated search functions (AND, OR, NOT, and so forth). They also normally provide an abstract of the article. And finally, consider cost. The price for using a database ranges from about $10 to over $100 an hour. If you access it often enough, Hyper Mac Subjects at $80 a year can be a good deal.

SuperMasterFile 1.0

SuperMasterFile ($99.95) from New Edge, an index to more than 5600 Mac-related products, is one of those rare stacks that is as powerful in structure as it is full of data. Each card in this stack describes one Mac software or hardware product, publication, or service. The cards give a description of the product, along with the company name and address.

The graphics and sound in SuperMasterFile are excellent. Almost all the functions can be announced with a Mac synthesized voice option. When you click an icon button the function is vocalized. All the functions—searching, sorting, telephoning—are controlled by descriptive icons.

SuperMasterFile allows you to search in specific fields for keywords such as product name, product description, or company name. The print function allows you to select which fields to print. And it prints all the data in scrollable fields, rather than only the visible data as in HyperCard's standard print function. If you are interested in a product, you can dial the company by clicking the telephone icon on any card. And if you click the Order icon, the program automatically fills out a complete purchase order ready to be mailed. This is HyperCard programming at its best.

HyperTutor 1.1.1

HyperTutor ($49.95) from Power Up Software Corporation is the best way I have seen to learn HyperTalk, HyperCard's programming language. It's an interactive tutorial stack that teaches—with one command per card—just about all of the HyperTalk language. Each lesson starts with the general concepts, displays examples, provides an opportunity for hands-on experience, and explains more advanced techniques. By the time you've completed the entire 41 lessons (about 20 to 40 hours of work), you are ready to begin your HyperCard project.

(continues)



SuperMasterFile Product Card

Clicking the mailbox icon toggles the third field between showing a description of the product and the vendor's address. The update buttons enable you to update cards by adding data. When you click the order icon, the program asks how many copies of the product you want, and then it prints a purchase order.

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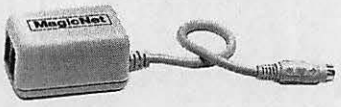
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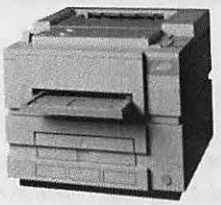
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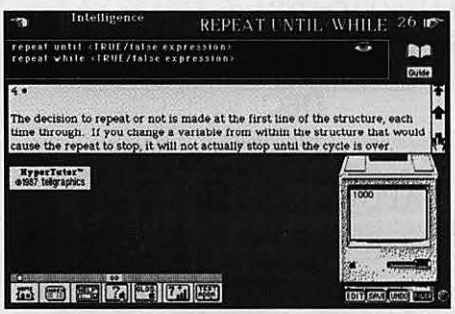
Circle 86 on reader service card

The main part of each lesson is contained in the Frame Window, a scrollable field that displays one step of the lesson (usually one or two sentences) at a time. After you've scrolled through five or six steps, you're instructed to use the Test Mac, a graphic of a Macintosh that, when you click it, displays on its screen the action of the HyperTalk command.

You can also experiment with the Test Mac script. By clicking the Edit button on the bottom of the Test Mac graphic, a script field appears. Using the script field, for instance, you can change *add* to *multiply* or *visual effect barn door* to *visual effect iris*. The Test Mac contains an Undo button, as well.

Each card is structured to be a reference as well as a lesson. If, while developing your own stack, you forget how a command works, you can get to the relevant HyperTutor lesson card through either a Find message or the Index (where you can click on any command to get to its card). HyperTutor also comes with a reference graphics guide, which shows you the HyperTalk name of each graphics tool, the number of each pattern, and the coordinates of screen locations.

The course is complete. It starts with basics, such as the use of message handlers, and moves on to navigational, text, and graphics tools, and then logical tests. While it doesn't include every example of each function (for example, not all message handlers or visual effects) most of what's missing from HyperTutor can be found in HyperCard's Help stack.



HyperTutor

As a learning tool, HyperTutor takes you through the frames one at a time. You can edit the script on the graphic of the Macintosh (called the Test Mac), which holds one HyperTalk script and displays the effects of that script on its screen. To use HyperTutor as a reference, you follow the syntax guide at the top.

Aussie Joker Poker

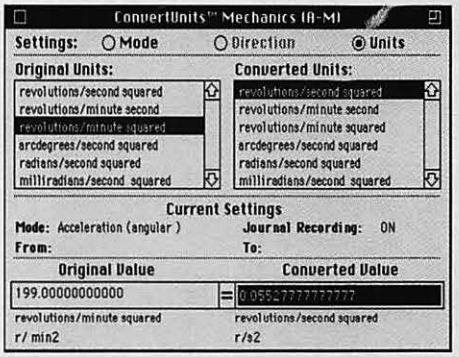
Aussie Joker Poker ($39.95) from Mindscape is a poker-type card game for 2 to 90 players. Each player completes a round (which can be any user-specified number of hands) before the next player begins. The player is dealt an initial five-card hand, which is scored according to the combination (single pair to royal flush), the value of the cards, and the suit (spades are high, hearts are low). You can then choose to either accept the score by sticking with this hand or try to improve it by discarding and replacing any number of cards (including the entire five-card hand). You can continue this process of discarding and receiving new cards indefinitely, but whenever you draw a hand that is equal or lower in points to the previous hand, you go bust. During the game, the high score appears at the top of the screen. After all the players have completed their round, the name of the winner is displayed.

The program has two user-definable options. You can designate a card from 2 to 10 to be the lowest card in the deck, so the deck will contain from 20 cards (10s to aces) to 52 cards. The program then deals from that deck and after each deal displays the number of cards remaining. You can also specify a betting value for each round, and the program then keeps a running total.

My one complaint with this game is that the program ignores any cards not in combinations. For example, if you have a pair of jacks with a nine high and then on the second deal you still have a pair of jacks but with an ace high, you have not improved your hand and you lose.

ConvertUnits 1.0.1

ConvertUnits ($59.95) from GTA (Graphics Text Applications) will convert many things into other things: U.S. pints to milliliters, Afghanistan time to Kansas City time, modern measures into traditional Arabic measures, and your weight on Earth to your weight on any planet in the solar system. The wide-ranging categories include electricity, mechanics, light and radiation, unit costs and quantities, and time. Each category comes with its own database, so you can save disk space by including only those databases you need.



ConvertUnits Control Window

In each conversion you have to input up to three types of data: mode, direction, and units. You enter the data that you want to convert in the Original Value box, click the equal sign (=), and the program computes the converted value and enters it in the Converted Value box.

Besides being loaded with data, ConvertUnits is well conceived. It comes in a DA version ($59.95; application and DA $74.95) so you can copy and paste data to and from other applications. It also keeps track of your sessions in a Journal. You can have as many journals as you want, and you can select any one to be active at any time during a session. You can then copy part or all of the entire journal into any application. The journal separates the units by tabs and separates each operation by returns, so format automatically falls into columns when pasted into a word processor or falls into rows and columns when pasted into most spreadsheets.

The user interface is convenient, and the database covers hundreds of types of conversions. The big question is whether it includes those you need (check with the manufacturer to find out). This program would be almost perfect if you could enter your own conversion formulas. M

See *Where to Buy* for contact information.

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NEW PRODUCTS

Edited by
Mary Margaret Lewis

This section covers Macintosh products formally announced but not yet evaluated by Macworld. All prices are suggested retail. Please call vendors for information on availability.

HARDWARE

Codex V.32 Modems

1200–9600 BPS full-duplex synchronous and asynchronous modems that transmit data over dial-up and leased lines. Conforms to the V.32 CCITT standard for modem transmission. Domestic and international models available. Domestic version $1695; international version $1900. Codex, 617/364-2000.

Digi-Pad ADB

Line of graphic tablets with pressure- and tilt-sensing stylus. Compatible with ADB interface port. Gives user control over brush size and shape, paint color, texture, and opacity. Tablet sizes range from 11 inches by 11 inches to 42 inches by 60 inches. $1750 to $4755, depending on tablet size. GTCO Corporation, 301/381-6688.



Digi-Pad ADB

Intellinet LocalTalk Connectors

Network connectors that are compatible with all implementations of LocalTalk. Come with 10-foot cable, terminator, network software and manual. $50. NexSys, 212/995-2224.

The Link Editing System

Electronic film-editing system that uses videotape. Mac controls from 9 to 16 VCRs for random access of the source material. Designed for television and film industry. $69,000–$79,000. Link Systems, 818/840-7175.



Mac86

Mac86

An 8086-based coprocessor board for the Mac SE. Supports Apple PC 5 1/4-inch drives, as well as DaynaFile or IBM 3 1/2-inch drives and accommodates LAN access via AppleShare or TOPS. $599. AST Research, 714/756-4942.

MacUPS

Uninterruptible power supply designed for Mac SE and Mac Plus that runs continuously from an internal battery. Provides 12 minutes of backup power. Weighs under 5 pounds and fits in Mac carrying case. $379.95. StatPower, 604/420-1585.

Maxi Screen Enlarger

Flat, flexible plastic Fresnel lens presents a magnified full screen view when placed 1/2 to 1 inch in front of the Mac SE or Plus screen. Lens fits over screen with Velcro straps. $19.95 plus $3 s/h. Engineering Consulting, 714/671-2009.

MaxStream

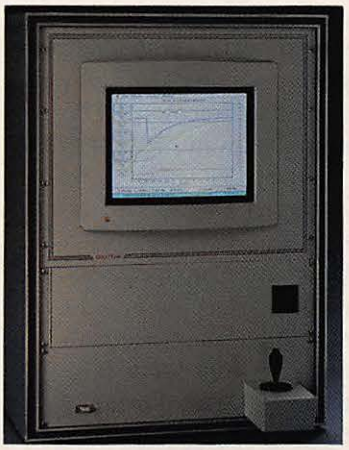
60MB and 150MB tape drives that allow data interchange between Mac systems and all DOS-based ArchiveVP Series drives. Performs image backup, scripting, and automatic tape backup. Compatible with MultiFinder. Archive, 714/641-0279.



MaxStream

Mega-ROM CD-ROM

Nonerasable CD contains 335MB of public domain and shareware files collected from user groups around the country. $49 plus $2.50 s/h. Quantum Leap Technologies, 305/446-2477.



The Monitor

The Monitor

Industrial data-acquisition and trend-monitoring system based on the Mac II. Monitors processes like temperature, pressure, flow, revolutions per minute, vibration, voltage, amperage, and equipment status. 240 analog input approximately $25,000; 960 analog input approximately $50,000. Monico Computer, 512/288-0195.

RGB/Video Link Model 400

Video scan converter for the Mac II transforms computer graphics to NTSC video. Has antiflicker filter; accepts full-screen, noninterlaced RGB input; provides genlock, sync generation, and encoding to output NTSC video. $9900 for

(continues)

basic scan converter; $11,400 with video-mix option. RGB Technology, 415/848-0180.

SOFTWARE

Aatrix Checkwriter

Desk accessory that lets the user print checks, maintain check ledgers, and budget expenditures while using spreadsheets, accounting programs, or other Mac software. 512K min. memory. $79. Aatrix Software, 701/746-7202.

A. S. & M. Phone Communications

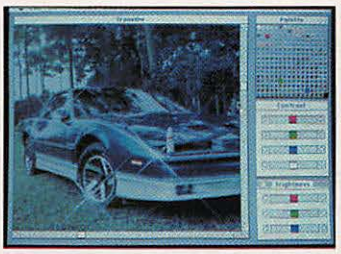
Desk accessory for AppleTalk networks; lets you use the Mac to communicate with other network users in real time. 512KE min. memory. Single-user license $60; AppleTalk zone license $900. Analytical Services Materials, 804/865-7093.

Backer

Disk-backup desk accessory that runs as a background routine to automatically back up files while you run other applications on the Macintosh. Lets you select files for backup; lets you do more than one backup per disk. 512KE min. memory. $60 plus $3 s/h. Moose Software, 415/325-1834.

Colorset

Software for the Mac II that can be used with any black-and-white flatbed scanners to produce color images. 1MB min. memory. $199. Studiotronics, 407/657-0677.



Colorset

Compu-Quote Collector Software

Database software for collectors of coins, stamps, and baseball cards. Each database contains descriptions of collectibles and their recent market prices. Report generator lets users track date and price of items bought and sold at a profit percentage. Annual updates available. 512K min. memory. $95 per collection. Compu-Quote, 818/348-3662.

Crazy Cars

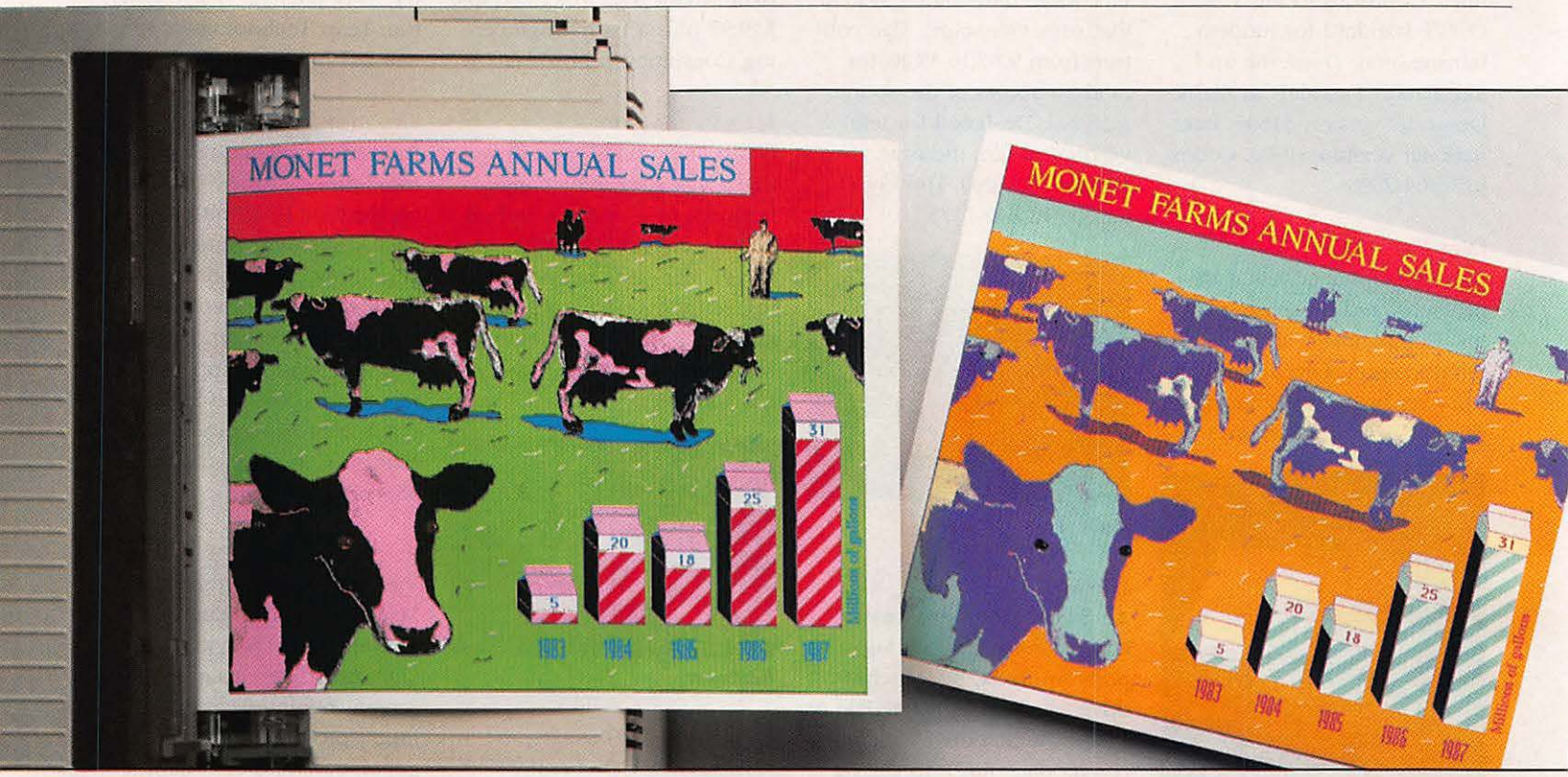
Car-racing game that gives you a choice of driving a Mercedes 560 SEC, Porsche 911 Turbo, Lamborghini Countach, or Ferrari GTO at speeds of up to 160 miles per hour. 512KE min. memory. $39.95. Titus Software Corporation, 818/709-3692.

Dr. Diagnostic's Reading

Testing program assesses capabilities of students in reading and develops criterion for additional study. Designed for elementary to college-level students. 512K min. memory. $49.95 including site license. Calibre Industries, 714/945-4771.

eXodus

X Window system display server for the Mac. Provides an X Window system front end to client applications. Conforms to Mac user interface standards; compatible with MultiFinder; and supports Appletalk, DECnet, and TCP/IP. 1MB min. memory. $499 per server. White Pine Software, 603/886-9050.



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GrabBag Utilities

Software package that contains 17 utilities for the Macintosh, including desk accessories, applications, F-keys, and a CDEV file. 512K min. memory. $49.95. Woodrose Editions, 608/836-9387.

HC Organiser

HyperCard information-management stack for names, addresses, phone numbers, and other personal data. Mail merge available to all cards or any one card in the stack. 1MB min. memory. $49. Max-Solutions, 619/481-0479.

HyperPort Chess and HyperChess Archives

HyperPort chess lets two people play chess via modem or direct null modem cable connection. HyperChess Archives is an electronic chessbook with 100 short classic chess games, called miniatures. 1MB min. memory. $49.95. Computer Ingenuity Consulting, 502/257-8065.

LetraStudio

Type customization software lets you manipulate individual character spacing. Includes type-specification menu to control font selection and text alignment, Pantone Matching System color selection, and fine adjustment for baseline curves. 1MB min. memory. $495. Letraset, 201/845-6100.



LetraStudio

MacAbel

Macintosh version of Abel programmable logic design software. 4MB min. memory. $2995. Data I/O, 206/881-6444.

MacDocument

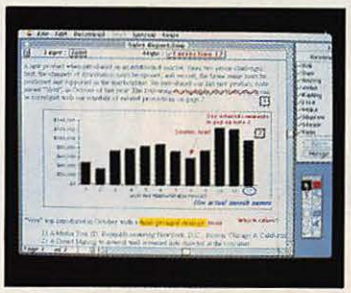
Document-management software that indexes and locates documents on the Mac. 1MB min. memory. $95. Kentrex, 615/843-0440.

Mac Jet

Flight-simulation software that includes features such as search radar, automatic target tracking, ejection seat, and free-flight mode. 512K min. memory. $49.95 plus $2.50 s/h inside United States, $6 s/h outside United States. Sublogic, 217/359-8482.

MarkUp

Multiuser application for workgroup editing and review. Changes to a document are made on a series of transparent overlays of the original document. 512KE min. memory. Two-user database package $495; five-user package $995; single-user version $195. Mainstay, 818/991-6540.



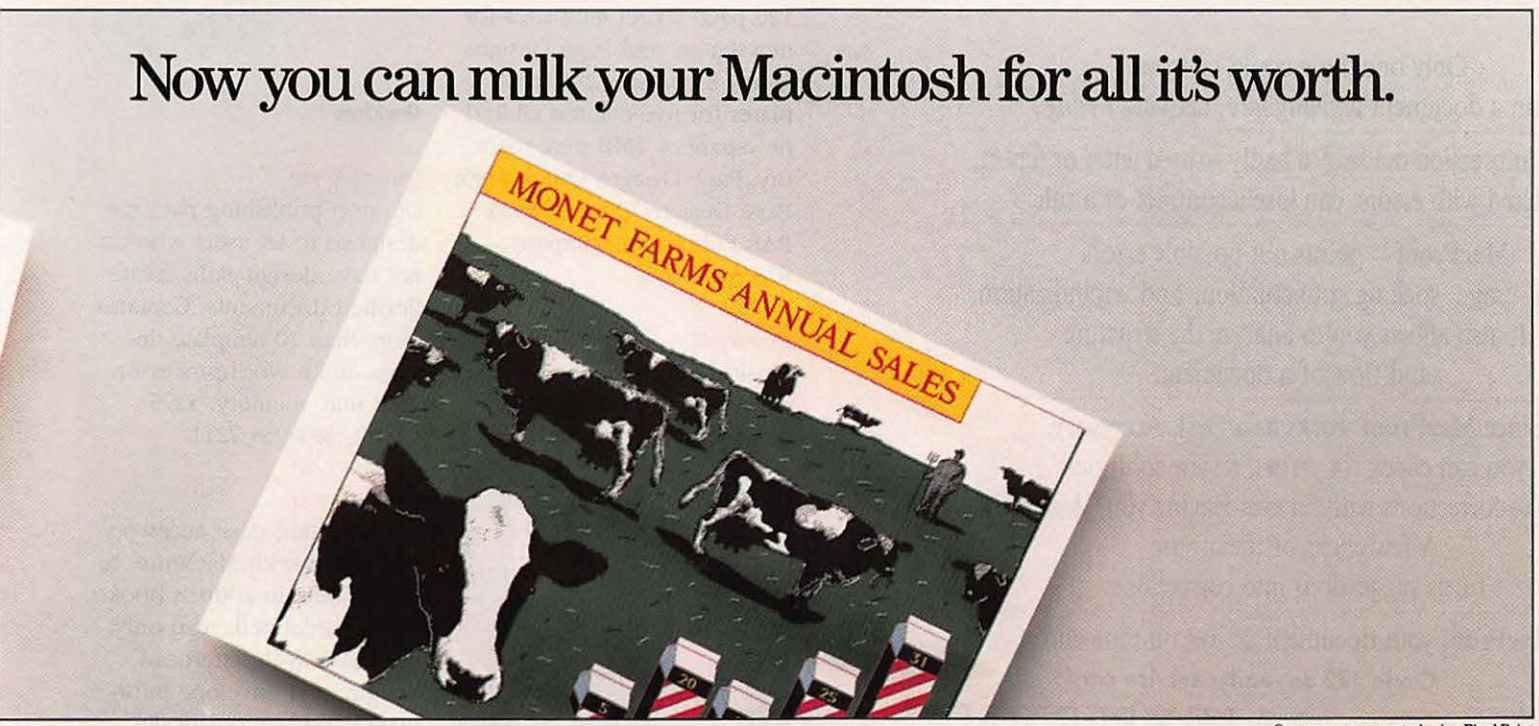
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NewsBuilder

Newspaper editorial workstation software bundled with Mac II monitor, extended keyboard, and added memory. Software includes database

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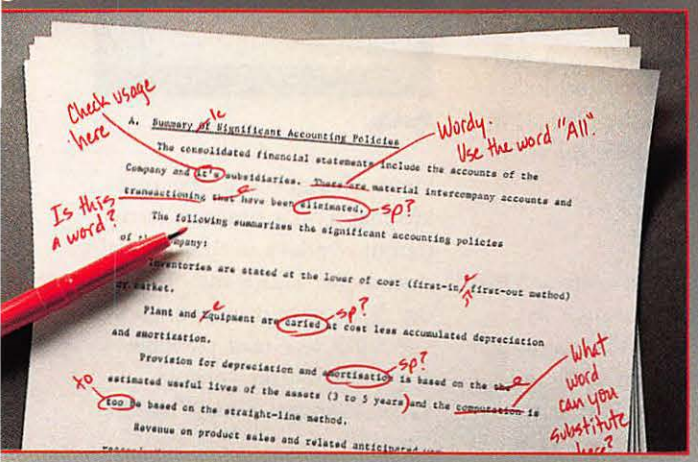
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manager for tracking articles, allows up to 20 windows open at a time, and includes graphic layout capabilities. Monochrome version $14,295; monochrome system with 21-inch display $15,295; color version with color monitor $19,999. Digital Technology, 801/226-2984.

Open Officepower

UNIX-based software that integrates Macintosh documents into a UNIX-based minicomputer and allows Mac users to access any document in the UNIX environment. Mac, DOS, and UNIX applications can operate simultaneously on the screen. 1MB min. memory. Price depends on system configuration. CCI Computers, 714/458-7282.

Page Designs Quick and Page Designs Quick 5

Software template pages for use with Aldus PageMaker 3.0. Page Designs Quick contains 120 page-layout templates for newsletters and Page Designs Quick 5 contains 255 templates for five-column tabloid newspapers. 1MB min. memory. Page Designs Quick $195; Page Designs Quick 5 $425. PAR Publishing Company, 818/340-8165.

Portrait

Musical composition and recording tool. Has multiple graphic staffs; graphic- and text-view editing; cut, copy, and paste time commands; and configurable keyboard shortcuts and menus. 1MB min. memory. $495. Resonate, 415/323-5022.



Portrait

PSMathGraphs

Graphics program for drawing "camera ready" graphs of mathematical functions $y = f(x)$. Supports ImageWriter, LaserWriter, and other PostScript printers. 512KE min. memory; Mac II compatible. $25. MaryAnn Software, 818/703-8824.



QuarkStyle

QuarkStyle

Desktop publishing package designed to let users who do not have design skills create finished documents. Contains more than 70 template designs and a word processor. 1MB min. memory. $295. Quark, 303/934-2211.

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Letter-writing desk accessory that works with MacWrite. Includes built-in address book; saves predefined, read-only stationery with letterhead, margin, and envelope information; and automatically places recipient address on

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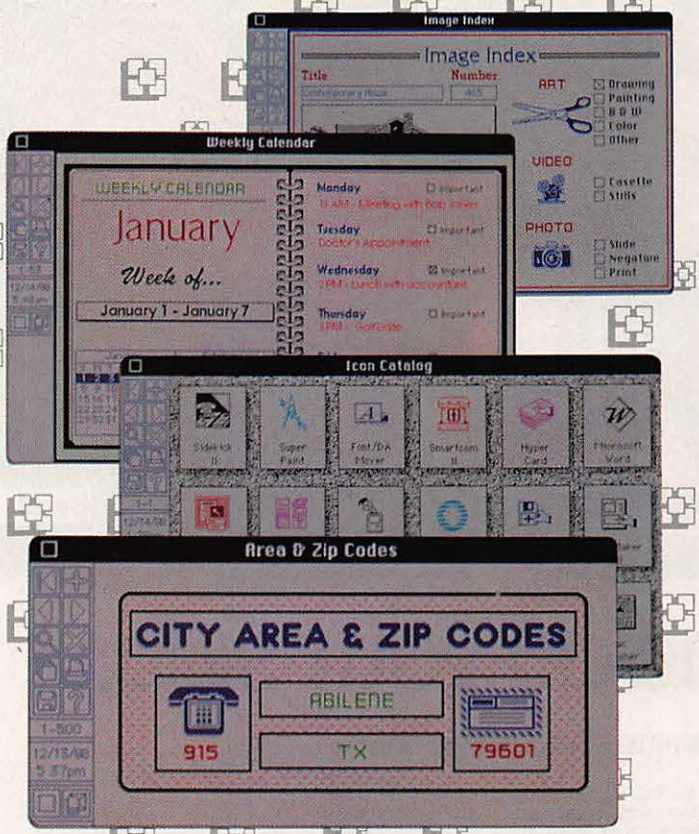
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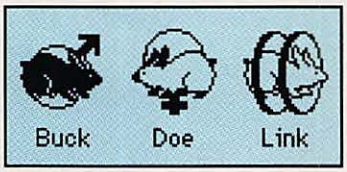
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envelope. 512K min. memory. $124.95. Working Software, 408/423-5696.

Rabbit

Software for keeping track of rabbit herds and learning about and predicting color genetics. Gives you printed lists of inventory, information about your herd, advice on breeding for color. Creates pedigree documents. 512KE min. memory. $150. Contact Tom Mason at P.O. Box 94, Granville, OH 43023.



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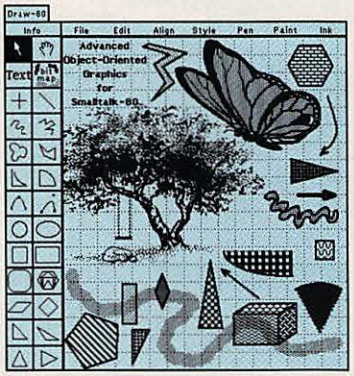
Nutritional software that calculates nutrient content of a meal or an entire day's intake and compares totals with user's individual nutrient requirements. Graphic displays help to interpret results. 1MB min. memory. $84.95. Print and Graphics Educational Systems, 415/665-3924.

SBT Database Accounting Library for the Mac

Accounting library with functions such as general ledger and financial reporting, consolidated and departmental income statements, and comparative balance sheets written in FoxBase+/Mac. 1MB min. memory. Single-user version with source code $395; single-user version compiled $295. Small Business Technology, 415/331-9900.

Shazam for the Mac

Version 6.1 of this command driven statistics program includes a Mac interface but is compatible with the PCs and mainframe computers it was originally designed for. 512K min. memory. Single copy $275; site license $1200. Vista Software, 604/228-5062.



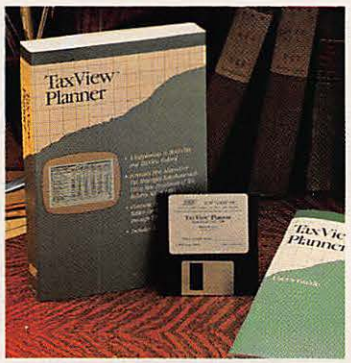
The Smalltalk Collection

The Smalltalk Collection

Series of software tools for Smalltalk developers. Draw-80 is an object-oriented drawing tool; PluggableGauges allows value-style monitoring of numerical values within any object in the SmallTalk-80 system; and NodeGraph-80 is a foundation for development of graphs. 2MB min. memory. Draw-80 $149; PluggableGauges $99; NodeGraph-80 $99. Knowledge Systems Corporation, 919/481-4000.

TaxView Planner

Tax-planning software that calculates and displays cumulative tax consequences of *(continues)*



TaxView Planner

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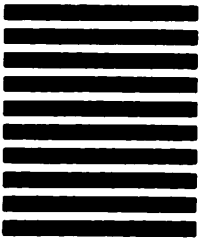


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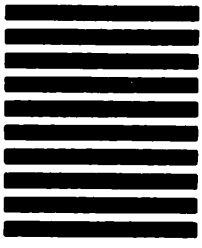


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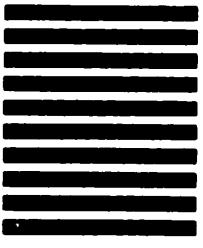


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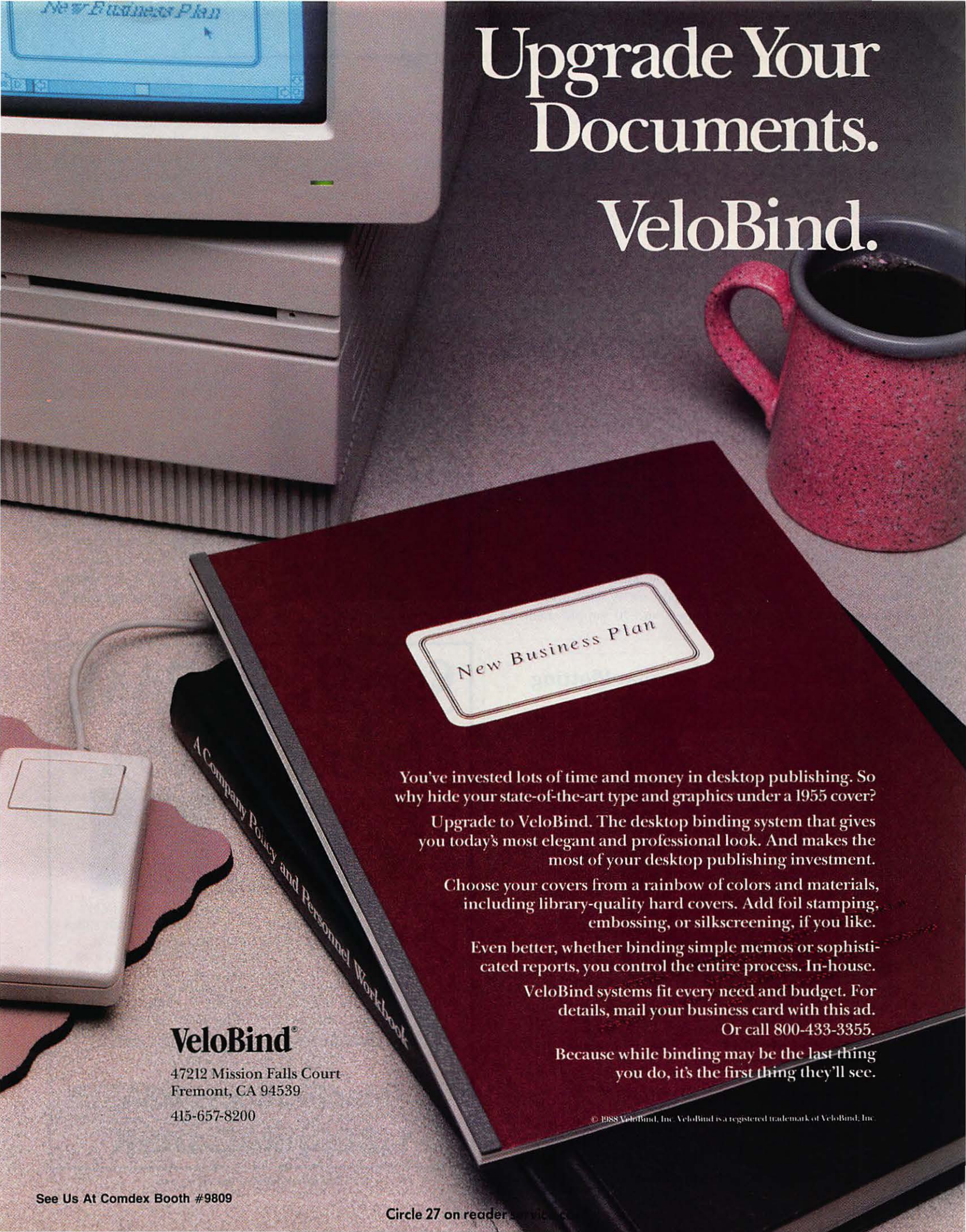
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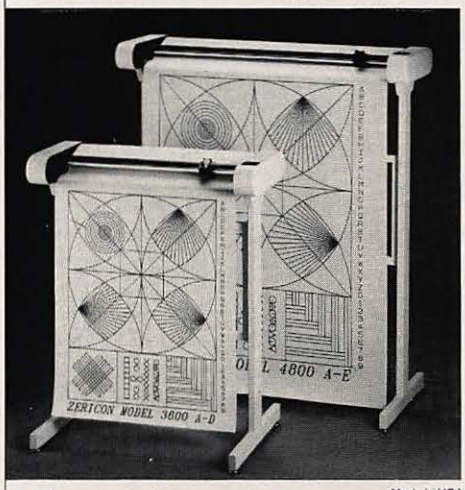
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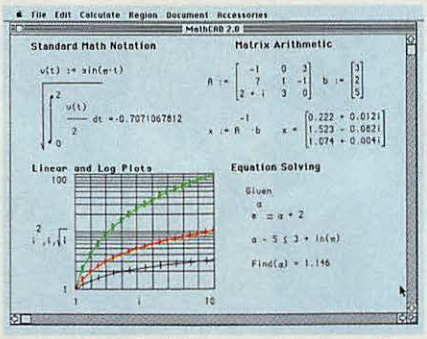
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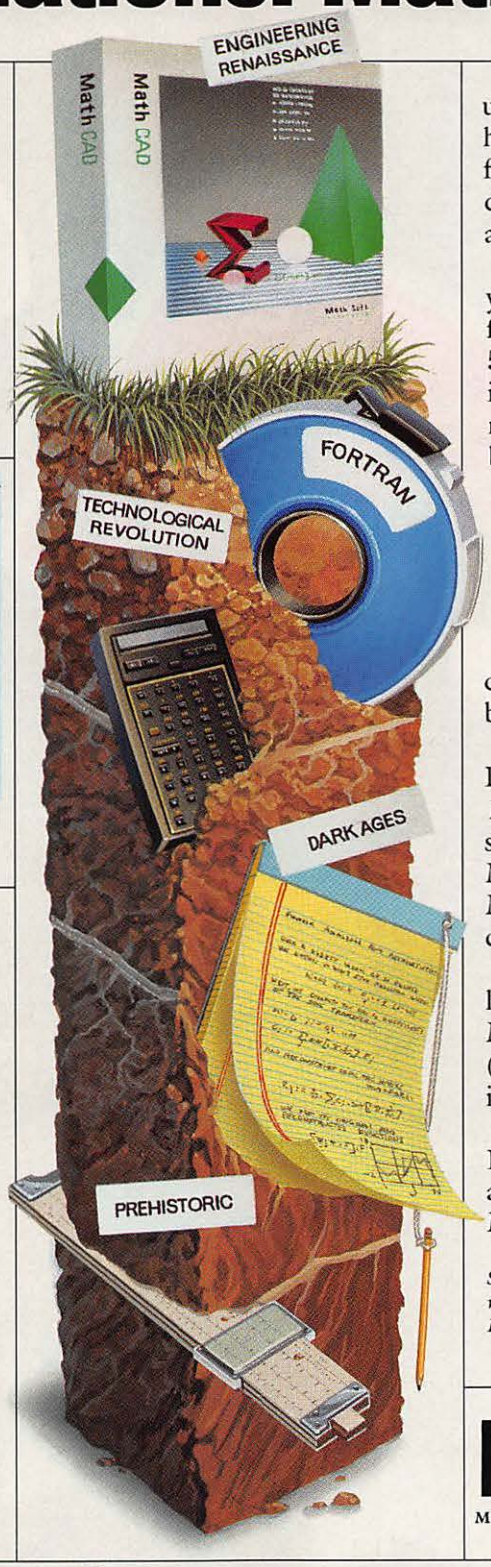


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Quick Tips

Using the Mac abroad, making a monitor support arm, and more

by Lon Poole

You can hide a positive numeric value on an Excel 1.5 spreadsheet by setting the numeric format of its cell to a blank space, as reported here last November. But that technique won't work for negative numbers, notes Coln Griffiths of Ottawa, Ontario. Instead, he suggests using two semicolons (;;) to suppress the display of any numeric value, as documented in the Excel manual (blush). Even one semicolon will do.

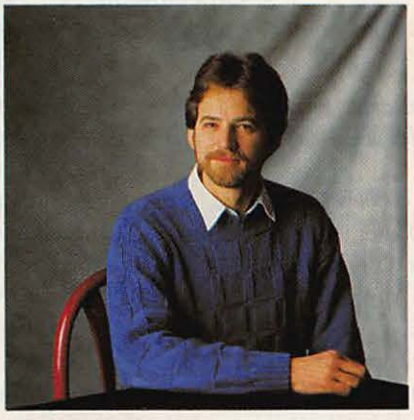
INTERNATIONAL TRANSFER

Q Can an associate in Paris send me 25 double-spaced pages of text via modem, or should he send me a fax? I have a Mac Plus with MicroPhone software, but he does not have a Macintosh.

Freude Bartlett
Berkeley, California

A Use your modems. You'll save money on the phone call because transferring text by 1200-baud modem is at least four times as fast as sending it by fax. As a bonus, you'll have a text file you can edit and format instead of 25 sheets of fax paper.

Before one modem calls the other, you must set the same baud rate, bits per character, parity, and stop bits in your communications applications. In MicroPhone, use the Communications command in the Settings menu. The most common settings are 1200 baud, 8 bit, no parity, and 1 stop bit. MicroPhone automatically sets 1 stop bit; MicroPhone II gives you the option of setting it manually. If you're going to receive a text file created with a word processor that has automatic word wrap (most do), you must set MicroPhone's Auto Wraparound option using the Terminal command in the Settings menu. Otherwise you will receive only the first lines of paragraphs. You may also want to read in your MicroPhone manual the information about X-On/X-Off, Wait for Echo, Wait for Prompt, Delay Between Characters, and Delay Between Lines. The standard settings for all these options should work, but you may need to change them if your computers have trouble communicating.



If you have an American modem and your associate has a French modem, use a transmission speed of 1200 baud. American modems modulate and demodulate digital data using Bell protocols, whereas French modems use CCITT protocols. The two divergent protocols converge at 1200 baud, so American and French modems should be able to communicate at that rate.

Neither France nor the United States restricts or licenses modem use, but some countries do. Germany, for example, requires a permit to use a communications device. Before you or your associate use a modem in another country, investigate local regulations.

A MAC ABROAD

Q I need to travel abroad, where the line frequency is 50Hz. Can an ImageWriter II, which requires 60Hz, be converted to use 50Hz?

Teodoro S. Kaufman
University, Mississippi

I'm returning home (outside the United States) with a Mac 512KE and an ImageWriter II. What should I use to convert the 220-volt (V) power there to the 110V power my system needs?

Hugo O. Saravia
Bloomington, Indiana

The nameplate on the back of my Mac SE lists the power requirements as 100–240V and 50–60Hz. However, there is no voltage switch visible for selecting U.S. (110) or European (220) voltages. Is the selection automatic? Can I simply plug the American SE into a 220V or 240V outlet in Europe?

Matt Karinen
via CompuServe

Are parts and service available for Macintosh computers in Europe generally and West Germany in particular?

Jeffrey L. Cotter
Santa Ynez, California

(continues)

A The summer travel season is upon us. Outside the United States and Canada, you may have trouble should your American computer need repairs. Apple dealers are not obliged to repair foreign equipment, even though most parts are the same regardless of nationality. Because Apple warranties and AppleCare service contracts are valid only in the country of purchase, you must return malfunctioning equipment to the country where you bought it. Therefore, be sure you test any new equipment thoroughly before exporting it so that any problems can be corrected on the warranty's home turf before you leave.

Electrical power is a minor concern with Apple products that have a universal, self-configuring power supply. To use an SE, a Mac II, a Mac IIx, an Apple Tape Backup 40 SC, or any Apple external hard disk anywhere in the world, all you need is a plug adapter to match the local socket. You can get adapters from Radio Shack.

Some non-Apple products have power supplies that can be set manually for 220/240V or 110/120V. Look for a switch on the back panel. Failing that, ask the dealer or manufacturer if there's a voltage selector jumper inside the power supply.

Equipment that operates only on 110/120V requires a transformer to operate in Europe, Australia, and other areas with 220/240V, 50Hz power. For a 128K, Mac XL, 512K, Mac Plus, ImageWriter I, or LaserWriter II, you can reduce the local voltage to 110/120V using a good-quality, grounded, isolation step-down transformer. The transformer should be rated to handle 50 percent greater wattage than the total of all equipment you attach to it (see "Volts and Watts"). For example, a transformer rated at 360 watts (w) would handle a 512K or Mac Plus and an ImageWriter I. Do not use a cheap voltage converter; it will ruin your computer equipment. Electronics Plus (800/321-4524 or 415/457-0466) has grounded step-down transformers in half a dozen wattage ratings, starting at 100w for about $30.

Some equipment should be used only with 60Hz power. If a device's nameplate or owner's manual lists only 60Hz, assume it should not use 50Hz power. Many non-Apple products have this restriction.

VOLTS AND WATTS

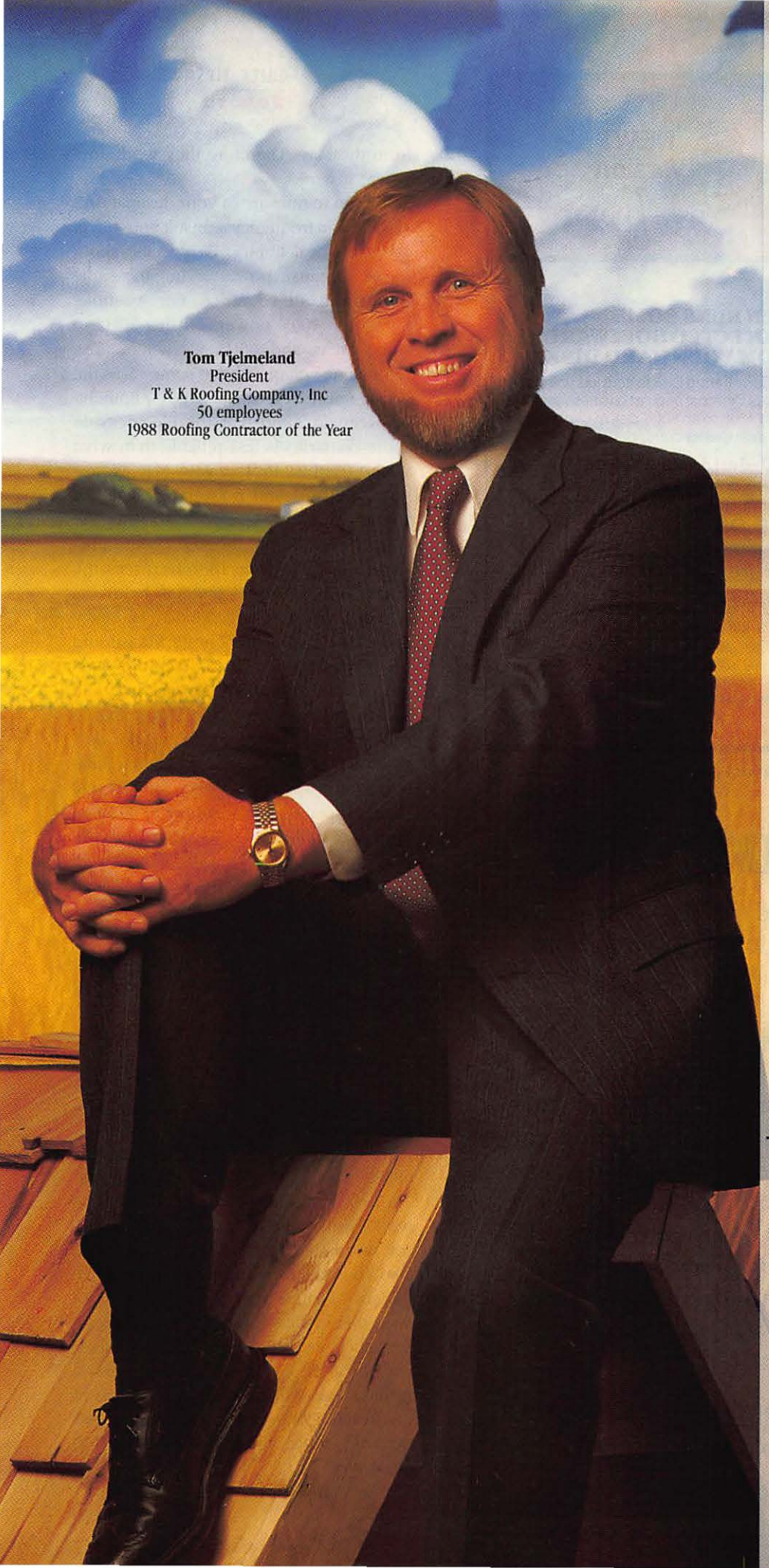
	Voltage range	Frequency range	Maximum watts
Isolation step-down transformer required for 220/240 volts			
Apple Scanner	107–137	50/60	65
AppleCD SC	107–137	50/60	40
ImageWriter I	107–137	50/60	180
LaserWriter IISC, IINT, IINTX	90–126	50/60	900
Macintosh 128K, 512K, 512KE, Plus	107–137	50/60	60
Macintosh XL	107–137	50/60	150
Isolation step-down transformer required for 220/240 volts (not recommended for use with 50Hz power)			
AppleFax Modem	107–137	60	10
ImageWriter II	107–137	60	180
ImageWriter LQ	107–137	60	180
LaserWriter, LaserWriter Plus	104–127	60	760
Adapter plug required (no transformer required)			
Apple Hard Disk 20	85–270	47–64	35
Apple HD20 SC	85–270	47–64	60
Apple HD40 SC	85–270	47–64	60
Apple HD80 SC	85–270	47–64	60
Apple Tape Backup 40 SC	85–270	47–64	15
AppleColor High-Resolution RGB Monitor	85–270	50/60	160
Apple High-Resolution Monochrome Monitor	85–270	50/60	40
Macintosh II	90–140 and 170–270	48–62	230
Macintosh IIx	90–140 and 170–270	48–62	230
Macintosh SE	85–270	47–63	100

The total wattage of all equipment connected to a step-down transformer should be about two-thirds of the transformer's rated capacity. The transformer lets you operate 110/120-volt equipment from a 220/240-volt source (common in many countries).

Apple products restricted to 60Hz include the ImageWriter II, ImageWriter LQ, original LaserWriter, LaserWriter Plus, AppleCD SC, Apple Scanner, and AppleFax Modem. Apple's current advice is to get an international model if you want to use any of these products with 50Hz power. In the past, people have reported that both an American ImageWriter II and a LaserWriter Plus work fine on 220/240V, 50Hz European electricity (stepped down to 110/120V with a transformer). About two years ago Apple engineers did condone using an ImageWriter II on 50Hz power, but that approval has apparently been rescinded. Apple has never blessed the American LaserWriter for 50Hz use. Its fuser/heater element is frequency-dependent and may overheat after long sessions on 50Hz power. A thermal sensor and a backup thermal sensor inside the LaserWriter detect overheating and shut the printer down if for any reason it gets too hot. You can probably get away with short-term, light-duty use of a U.S. LaserWriter on 50Hz power, especially if you don't leave it on continuously. (Be sure to use a step-down transformer.)

Devices that don't have power plugs, such as the mouse, keyboard, and external floppy disk drives, take their power

(continues)



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from the Mac. Therefore they work anywhere it works.

If you're not sure of your destination's voltage and frequency, consult your travel agent or local library. Be specific about locale, because power is not the same throughout all countries. For example, Japan has 100V power, but it's 50Hz in some areas and 60Hz elsewhere. The wrong line voltage, and in some cases the wrong frequency, can damage equipment.

Keep in mind that the electricity in some countries is less reliable than what you're used to. Protect your Mac against voltage spikes and noise by plugging it into an American surge protector. Plug the surge protector into the step-down transformer, if you use one. In some places, the actual voltage drops markedly below its nominal value during periods of heavy electrical use. To compensate, you should be able to buy a suitable step-up transformer after you arrive. Just ask how the local residents keep their TVs going. If power outages are common at your destination, you must decide whether to take along an expensive, bulky, and heavy uninterruptable power supply or to leave your Mac behind.

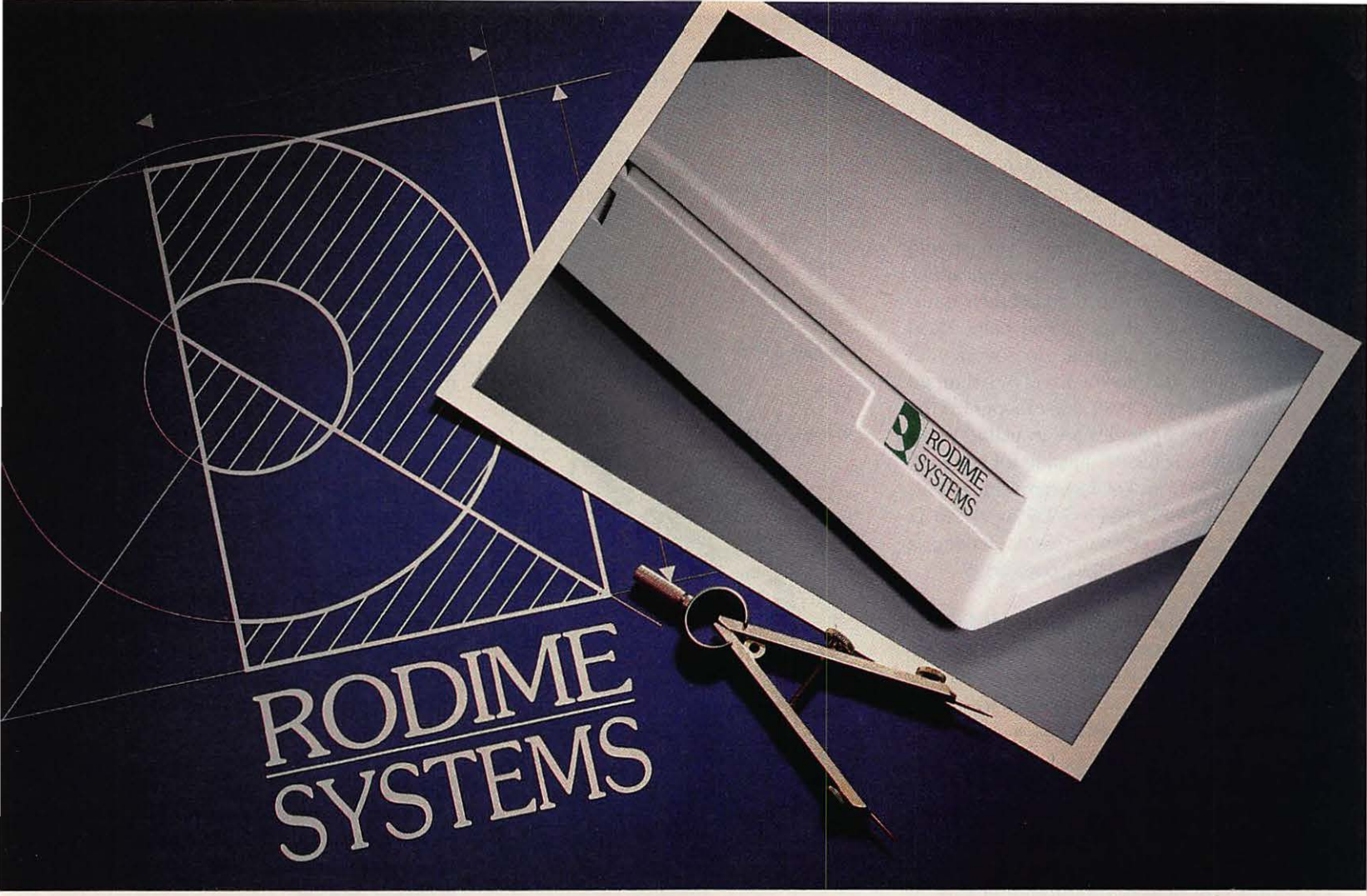
MATH UPGRADE

Q Can Mac owners of 68020-based machines replace their 68881 with a 68882 chip themselves? Will the only result be to speed up number crunching? Who sells these chips?

John Spence
Tempe, Arizona

A According to Apple, a Mac II will work properly if you replace its 68881 numerics coprocessor with the newer model 68882. Dove Computer claims its MaraThon 020 accelerator board for the SE works with a 68881 or a 68882 coprocessor, and I suspect most other brands will also (but check with the manufacturer). Expect 25 to 40 percent improvement in tasks that involve lots of number processing, such as calculating math, statistics, and new views of complex graphics. Applications written to take advantage of the 68882's features can increase their numerics processing speed by up to 100

(continues)



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percent. Installing a 68882 has no direct benefit aside from speeding up floating-point numerics calculations.

Before changing chips, you should contact the publishers of the applications you hope to speed up and get their assurances that the upgrade will help. Excel version 1.5, for example, does work with the 68882. (Copies of Excel 1.5 shipped before October 1988 don't recognize the 68882; free upgrades are available.)

A 16MHz 68882, suitable for a Mac II, costs $395 from Total Systems Integration (800/874-2288 or 503/345-7395). A 20MHz 68882, for accelerator cards having a 20MHz 68020 or 68030, costs $595.

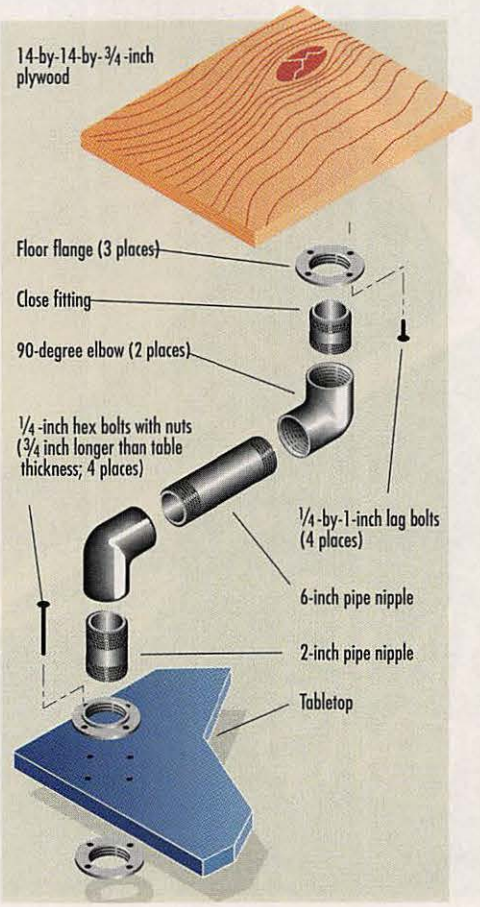
Warning: *Both the 68881 and the 68882 have 68 delicate pins and can sustain latent damage from static discharge during handling. Have a technician make the swap unless you know what you're doing. Replacing the 68881 may void the Apple or AppleCare warranty (naturally, the 68882 is not covered anyway).*

HIGH-TECH SUPPORT

TIP: After discovering that a Mac II and monitor fill my desk, I decided to move the Mac II and get a monitor support arm. Arms cost between $150 and $400, well out of my price range, so I built my own for about $20. I used 1 1/2-inch galvanized iron water pipe and fittings (plastic pipe won't work). For a diagram and complete parts list, see "Pipe Up." When you connect the 6-inch pipe to the two elbows, make the two joints as tight as possible—I used Loctite on mine. Otherwise the arm might dump your monitor on the floor. Tighten the other pipe-to-elbow joints as well, but leave the pipe-to-flange joints somewhat loose to allow the arm to swivel. Be sure to use a flange on the underside of the desk to spread the load; washers are not enough.

You can change the reach of your support arm by using a different length of horizontal pipe. The 6-inch nipple specified provides an 8-inch reach, center line to center line. To change the height of the plywood platform, use a different vertical

(continues)



Pipe Up

Construct your own swiveling monitor support arm from 1 1/2-inch iron water pipe and fittings. Make the joints tight at the elbows, especially where the horizontal pipe connects. Leave the joints at the flanges somewhat loose.

Open stacks without going out to get in



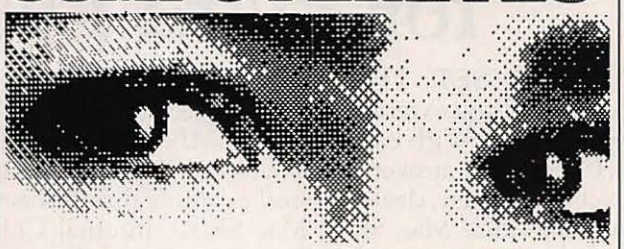
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If you take your Mac home from work and own an external hard drive, Cutting Edge has a suggestion that can make your life a bit easier. Consider buying the new Cutting Edge Floppy Drive for your home office and leave your hard drive at work. Not only do you save the trouble of lugging your hard drive around, but you eliminate the danger of losing sensitive data enroute. And you won't run the risk of "junior" accidently erasing some important files.

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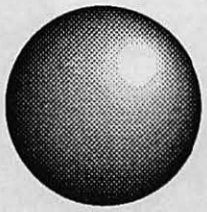
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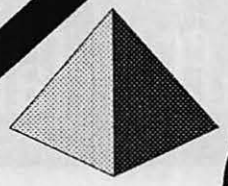


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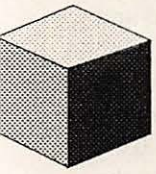
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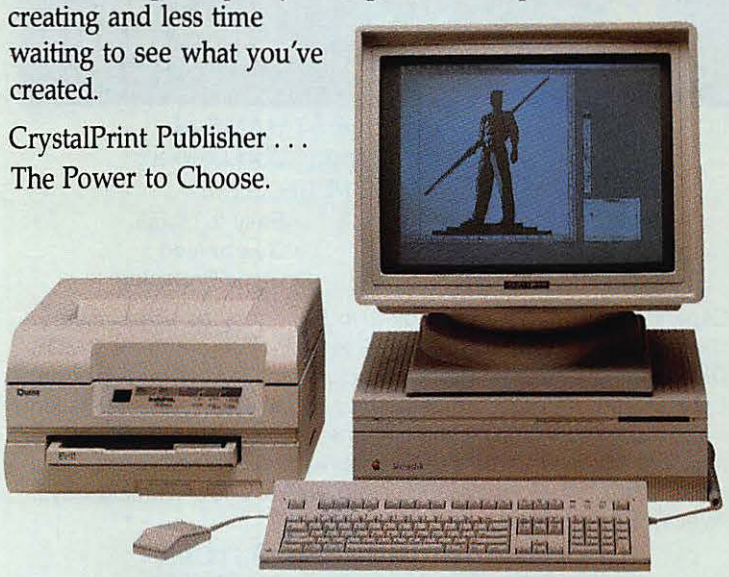
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pipe. A 2-inch nipple holds the platform 7 1/2 inches above the desk. You can use a close fitting instead to make the platform as low as possible, about 5 1/2 inches.

The arm is quite strong; it easily holds my 60-pound monitor. Of course, it's neither as pretty nor as flexible as an AnthroArm, but it didn't cost $400 either.

Douglas Surber
Austin, Texas

MACCALC TABLE LOOKUPS

TIP: You can use MacCalc's Choose and Index functions together to do table lookups. The Index function will look for a match in a table of keys and will return the offset of the match from the beginning of the table. The Choose function will use this offset to pick out an entry from a corresponding table. For example, suppose the range D2:D5 is named Items and contains the text values "nuts," "bolts," "screws," and "nails." The corresponding range E2:E5, named Prices, contains the numeric values 0.10, 0.15, 0.25, and 0.05. If A1 contains "nails" and B1 contains the formula

```
=CHOOSE(INDEX(A1,ITEMS),PRICES)
```

then the value of B1 is 0.05. The Index function in this formula returns 4 because it finds a match for A1 in the fourth cell of Items. The Choose function therefore returns the value of the fourth cell of Prices, which is 0.05.

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Bravo Technologies
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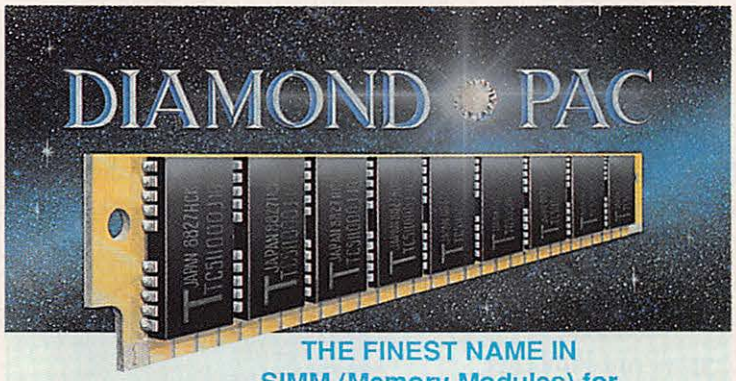
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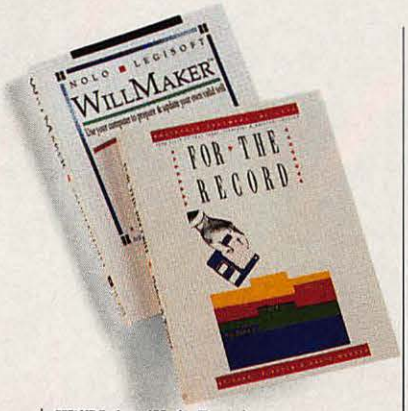
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Springboard
Family Matters 28.
Symmetry
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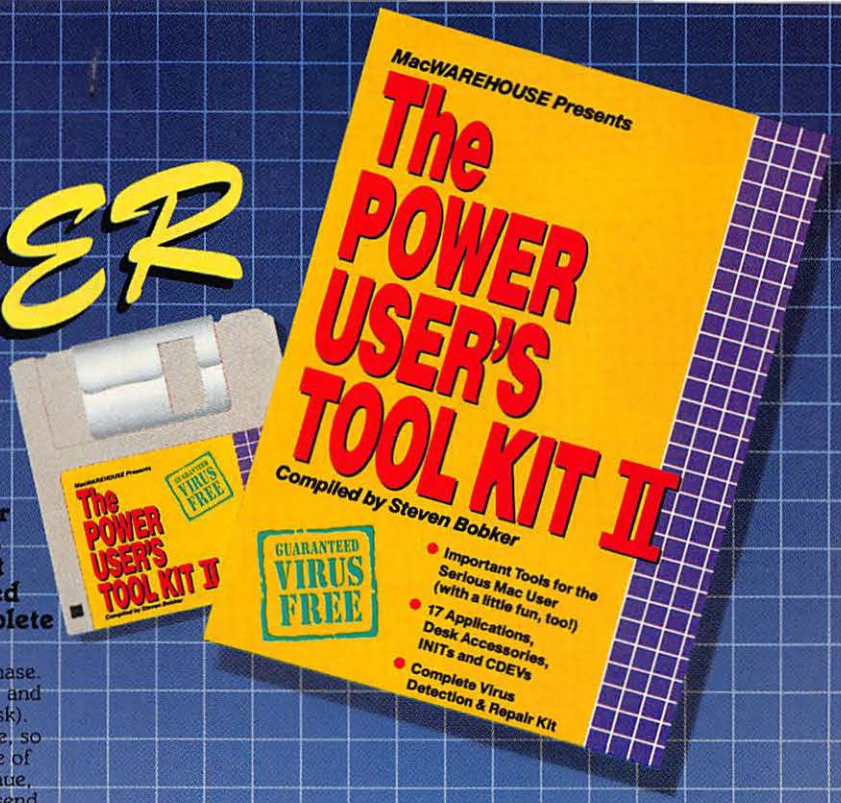
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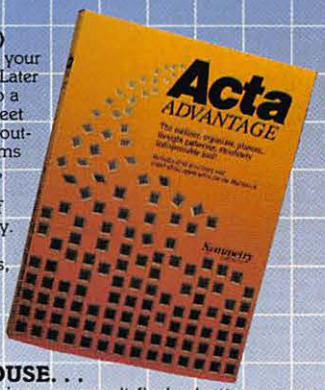


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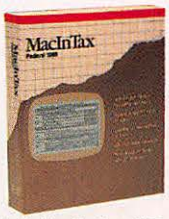


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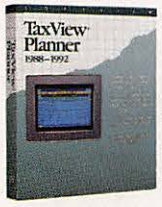
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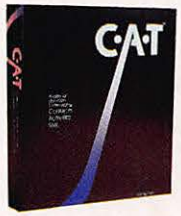
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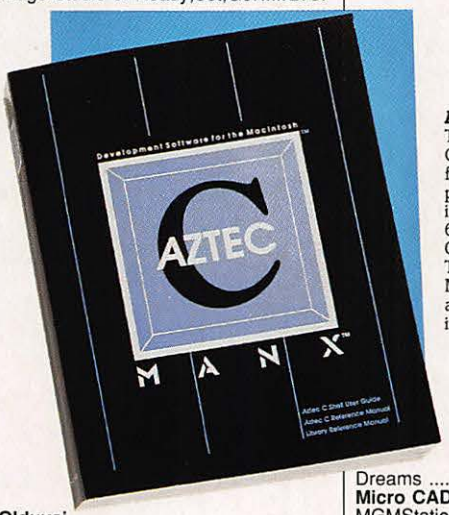


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PixelPaint 2.0 209.
Symmetry
PictureBase & WetPaint 95.
Zedcor
Deskpaint 2.0 69.

DESKTOP PUBLISHING PRODUCTS

Adobe
Illustrator 88 309.
Streamline 249.
Aldus
PageMaker 3.0 399.
Broderbund
DTP Advisor 47.
Emerald City Software
Smart Art I –Text Effects 95.
Letraset
Image Studio or Ready,Set,Go! 275.



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Olduvai
Read-It! 2.0 *(OCR)* 199.
Quark
Xpress or QuarkStyle Call.
Springboard
Springboard Publisher 109.

NETWORKING PRODUCTS

Connect Inc.
MacNet 43.
Farallon
Timbuktu 2.0.1 69.
TOPS
TOPS 2.1 149.

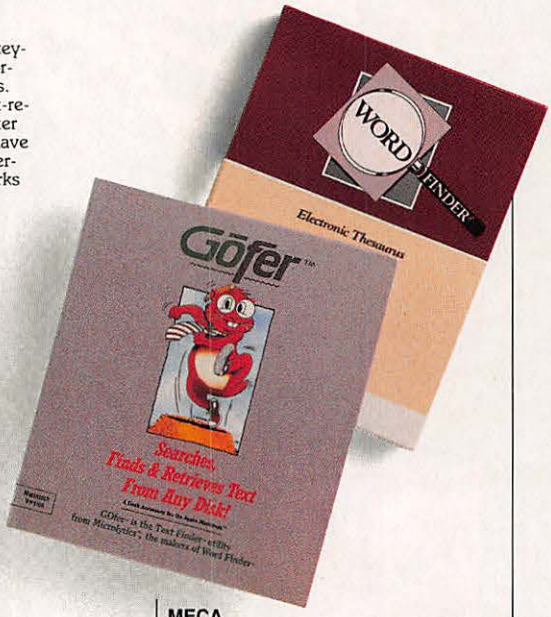
FONTS

Adobe
Fonts (All Avail.) Call.
Altsys
Fontastic Plus 2.0 54.
KeyMaster` 60.
Letraset
LetraStudio 289.
LetraFonts *(various)* ea 69.
Olduvai
ArtFonts 55.

CAD/CAM

Claris
ClarisCAD Call.
Generic Software
Generic CADD Level 1 54.
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MiniCad Plus 525.
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MGMStation *(professional CAD)* ... Call.

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Quicken 33.
MECA
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Monogram
Business Sense 279.
Softview
MacInTax Federal '88 69.
TaxView Planner 64.
Survivor
MacMoney 3.02 62.

STATISTICAL ANALYSIS

Abacus Concepts
StatView II 349.
StatView SE+Graphics 229.
BrainPower
StatView 512+ *(requires 512k)* 175.
D2 Software
MacSpin 2.0 189.
Odesta
Data Desk Professional 289.
Paracomp
Milo 169.
Select Micro Systems, Inc.
Exstatix 219.
Wolfram Research
Mathematica (SE) 450.

MUSIC AND SOUND

Altech
MIDI Interface 59.
MIDI Basic 30.
Coda
MacDrums 32.
Perceive 52.
Electronic Arts
Deluxe Music Construction 2.5 84.
Farallon Computing
MacRecorder *(records sound)* 145.
Impulse
Audio Digitizer w/SoundWave 139.
Passport Designs
Master Tracks Pro 259.

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AEC Information Manager 415.
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dBase Mac 295.
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Reflex Plus 189.
Chang Labs
C.A.T. 229.
Claris
FileMaker II 237.
Fox Software
FoxBASE+/Mac 1.1 208.
Odesta
Double Helix II 339.
GeoQuery 199.
ProVUE
Panarama 209.

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AEC Management Systems
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Persuasion 1.0 389.
Ashton-Tate
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Cricket
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Cricket Presents 289.
HyperPress Publishing
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Informix
WingZ Call.
MicroPlanning International
MicroPlanner Plus 385.
Microsoft
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WillMaker 34.
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Symantec
More II 225.
Vertical Solutions
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Ashton-Tate
FullWrite Professional 269.
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Microsoft
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Write 1.0 79.
Niles & Associates
End Note 82.
Symmetry
Acta Advantage w/DA 69.
T/Maker
WriteNow 2.0 109.
WordPerfect Corp.
WordPerfect 185.

SPELLING CHECKERS

Aegis Development, Inc.
Doug Clapp's Word Tools 42.
A.L.P.
MacProof 3.0 115.
Deneba Software
BigThesaurus 54.
Spelling Coach Pro 105.
Electronic Arts
Thunder II 52.
Microlytics
Word Finder *(synonym finder)* 33.
Sensible Software
BookEnds or Sensible Grammar ea 54.
Working Software
Spellswell 2.0 45.

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Business 1 69.
Aba Software
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GraphistPaint II 289.
Aegis Development, Inc.
Showcase F/X 209.
Aldus
Freehand 2.0 349.
Broderbund
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PosterMaker Plus 36.
TypeStyler Call.
VideoWorks II 175.
CE Software
CalendarMaker 27.
Claris
MacDraw II 2.0 319.
MacPaint 2.0 102.
Cricket
Cricket Draw 169.
Cricket Paint 119.
Deneba
Canvas 2.0 159.
Dream Maker
Cliptures, Business Images 95.
MacGallery 28.
Electronic Arts
Studio/8 319.
Microlllusions
Photon Paint 179.
MicroMaps
MacAtlas Pro *(MacDraw format)* ... 129.
Miles
Mac The Knife III (Mac the Ripper) .. 32.
Mac The Knife IV (Orchestra of Fonts)32.
MacTheKnifeV(People,Places,Things)32.
Mac The Knife VI(Tak'g Care of Bus.)32.
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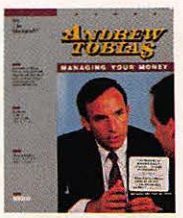
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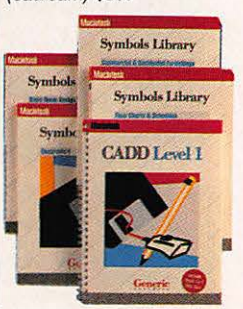
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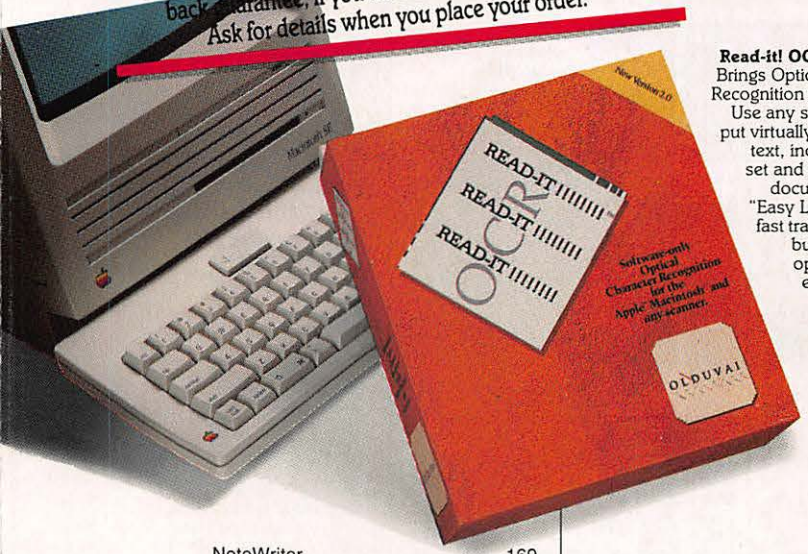


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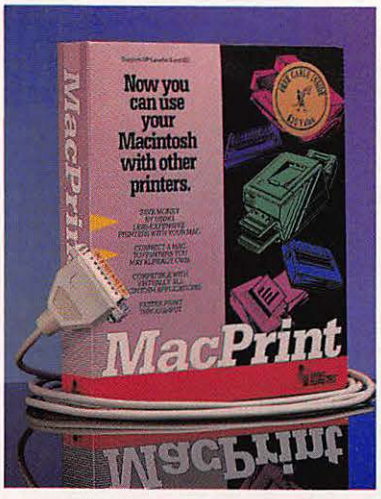
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Brings Optical Character Recognition to your Mac. Use any scanner to input virtually any printed text, including typeset and laser printed documents. New "Easy Learn" superfast training option, built-in speech option and file export to any Macintosh application. Requires only one Megabyte of RAM. *(desktop publishing)* **$199.**

NoteWriter 169.
Resonate
Listen 2.0 62.

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Artworx
Linkword Languages(Sp,Fr,Ger) ..ea 25.
BrightStar
Talking Tiles 69.
Bootware Software
ResumeWriter Pro 75.
Broderbund
Calculus, Geometry, Physics ea 59.
Type 20.
Davidson
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Speed Reader II 39.
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Simon & Schuster
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The Software Toolworks
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Voice & Video
HyperCard Getting Started 35.
PageMaker 3.0 Video Tape 35.
Word 4.0 Video Tape 35.

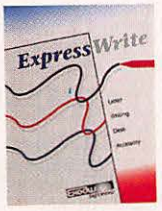
GAMES

Access Software Inc.
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Artworx
GrailQuest 19.
Broderbund
Ancient Art of War At Sea 27.
Shufflepuck Cafe 24.
Where in the World is Carmen 27.
Bullseye
Ferrari Grand Prix or P51 ea 32.
Centron Software, Inc.
BlackJack or CrapsMaster ea 27.
CasinoMaster *(5 pack)* 55.
Discovery Software
Arkanoid 27.
Electronic Arts
Starfleet I: The War Begins 37.
Chuck Yeager Adv. Flight Trainer ... 32.
Epyx
Sub Battle Simulator 29.
HyperPress Publishing
Silver Screen 42.
Infocom
Leather Goddess of Phobos 15.
Mindscape
Balance of Power, Deja Vu ea 30.
Shadowgate, Uninvited ea 30.
Nemesis
Go Master 49.
Joseki Tutor 30.
PCAI
MacCourses 29.
MacGolf 2.0 35.
MacGolf Classic 54.
Road Racer 41.
Sierra On-Line
Leisure Suit Larry 23.
Silicon Beach
Beyond Dark Castle 27.
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Falcon 2.0 32.
PT109 or Gato ea 26.
Solitare Royale or Tetris ea 20.
The Software Toolworks
Chessmaster 2100 32.
Life & Death 34.
The Hunt for Red October 29.

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MacStack 40 Meg 789.
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Cutting Edge
800K Disk Drive "NEW" 175.
Wedge XL 30 Plus 549.
Wedge XL 45 Plus 729.
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Dayna Communications
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Dove
FastNet (full line available) Call.
MaraThon LAN 020 Call.
MacSnap 2S 750.
MacSnap 2SE or Plus II 439.
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MacSnap 8S 2975.
MacSnap SCSI Interface Port 109.
MacSnap 524E *(512k to 1 meg)* 289.
MacSnap 548E *(512k to 2 meg)* 549.
MacSnap 1024 Mem. Exp. Board Call.
MaraThon SP 189.
MaraThon Accelerators Call.
Everex
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EMAC 20D Deluxe *(O footprint)* 585.
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EMAC 60T *(tape backup)* 895.
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Impact Hard Drives Call.

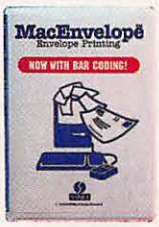
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Rapport 229.
La Cie Ltd..
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Peripheral Land, Inc.
Infinity Turbo 40 Meg 1299.
UniMac
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Quantum
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Quantum 80 MB Raw Drive 897.

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EPIC Technology
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Everex
EMAC 2400 225.
Hayes
Smartmodem 1200 299.
Smartmodem 2400 449.
Smartmodem 9600 *(V series)* 985.
Prometheus
Promodem 2400 309.
Promodem 2400M 199.
Shiva
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Supra Modem 2400 149.
US Robotics
Courier Modems Call.

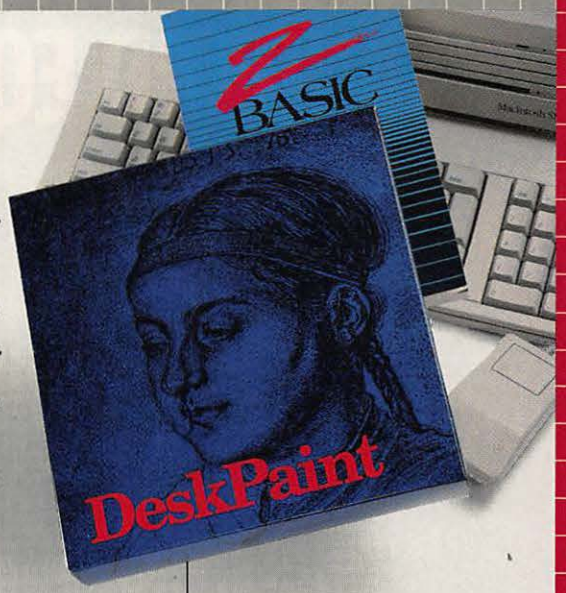
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DS/DD *(box of 10)* 17.
Sony
DS/DD *(box of 10)* 18.

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DataDesk
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Koala
MacVision 2.0 219.

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Seikosha Printer *(dot-matrix)* 235.
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ThunderWare
LightningScan 449.
ThunderScan 5.0 189.

ACCESSORIES

Computer Friends, Inc.
MacInker *(IW & IW II)* 41.
Ergotron
MacTilt or MacTilt SE 68.
Goldstein & Blair
The Macintosh Bible 21.
I/O Designs
ImageWare II Carrying Case 49.
ImageWriter LQ Ribbon Call.
IW II Ribbons-Black or Color Call.
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MasterPiece Mac II 105.
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Orange Micro
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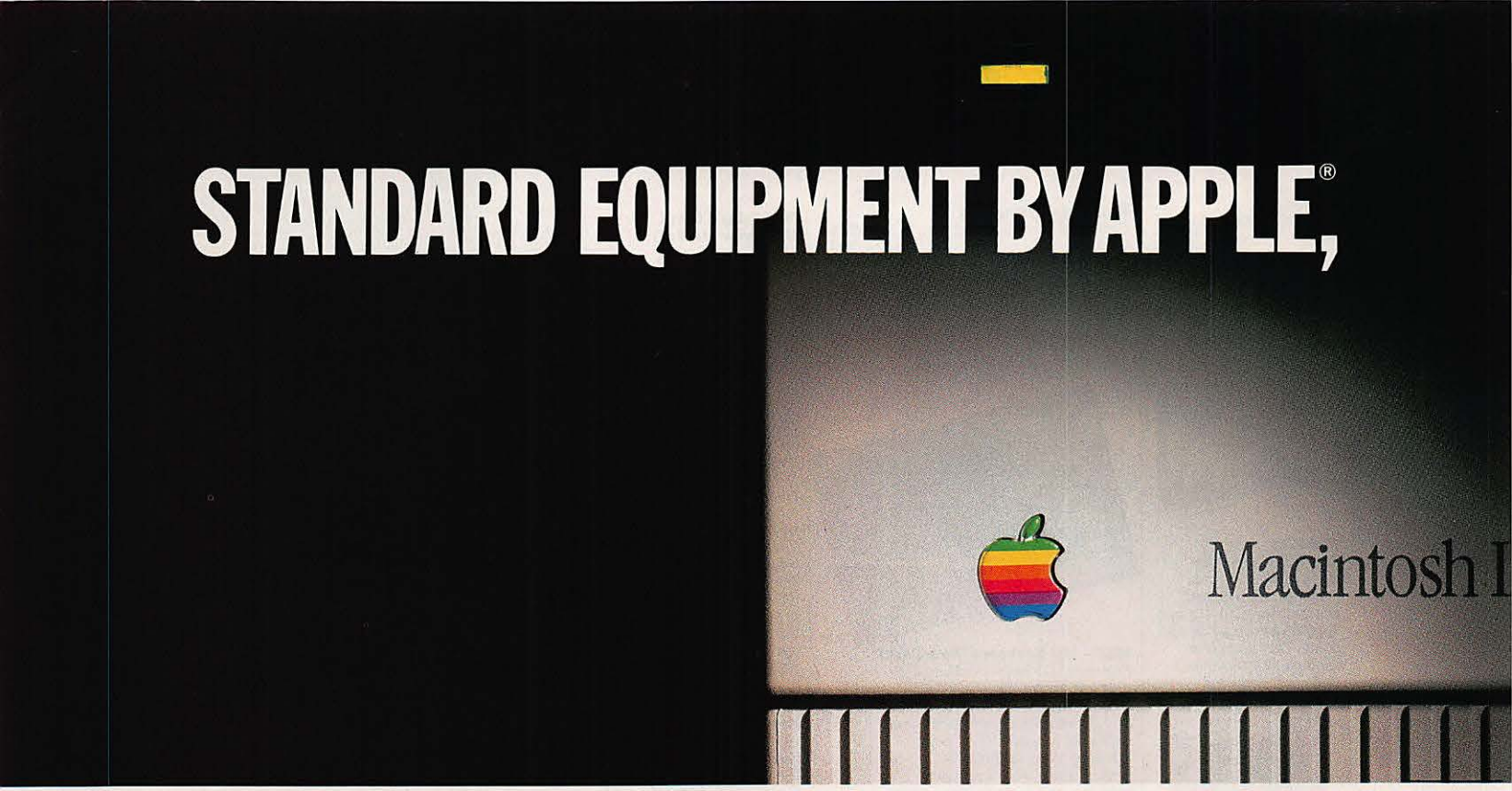
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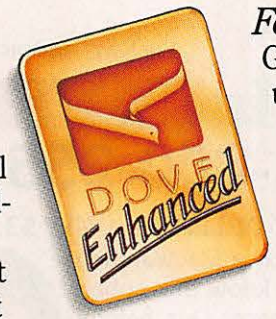


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Circle 174 on reader service card

Getting Started with HyperCard

A hands-on look at HyperCard and its possibilities

by Jim Heid

HyperCard defies simple definitions. Call it a database manager, and you short-shrift its MacPaint-like drawing features. Call it a paint program, and you ignore its ability to store and retrieve information. HyperCard isn't educational software or a game, but it can educate and entertain. It isn't part of the Mac's System Folder, but like the Finder, it can start applications and open documents. It isn't a programming language, but it has introduced thousands of people to the fun and frustration of programming.

Appreciating HyperCard's versatility is easier if you consider the code name it bore during its gestation: WildCard. In poker, a wildcard represents any card and can make a winning hand. Similarly, HyperCard can be sculpted into nearly any kind of application, thus rounding out your computing toolbox.

This month, I examine this software wildcard and spotlight some stellar HyperCard applications. For those who haven't gone beyond browsing HyperCard's stacks, I've included a short exercise that introduces customizing basics.

THE THREE KEYS TO HYPERCARD

Three factors combine to give HyperCard its wildcard versatility: its card-and-stack metaphor, its painting features, and its built-in programming language, *HyperTalk.*


JOHN CRAIG

HyperCard presents and stores information on *cards.* In an electronic address book, for example, each person's name and address is stored on its own card. Cards that accept information from you contain *fields,* each of which stores a piece of information, such as a name or a phone number. A card can also contain *buttons*—hot spots you click on to perform an action, such as moving to a different card for more information. A collection of related cards—such as all the cards in the address book—form a *stack* (see "Fields, Cards, and Stacks").



HyperCard's painting tools do everything MacPaint's tools do, and more. You use them to create text and graphics on individual cards, and to draw *backgrounds,* which appear beneath cards in a stack (see "In the Background"). You can also paste graphics from the Clipboard to create a scrapbook of drawings—or to store a scanned photo of each person listed in your address book.

HyperTalk ties HyperCard's features together. By creating HyperTalk *scripts*—short command sequences that control HyperCard's actions—you determine how a stack responds to its users. A script for a button named Next might tell HyperCard to advance to the next card when the button is clicked. A script for a field named Date might tell HyperCard to display an error message if someone enters an invalid date, such as February 31. You can also design HyperCard scripts to control videodisk players and music synthesizers, or to play digitally recorded sound (see "Hearing HyperCard").

A complete HyperCard stack—be it a business-management application, a children's story, or an introduction to bird anatomy—makes extensive use of the three elements I've just described. The stack's cards use text and graphics to convey information. The cards may also contain fields for accepting new information, and buttons for moving to other cards or otherwise controlling the stack. Behind the scenes, HyperTalk scripts define each button's action, calculate numbers, display messages, produce sound, and do whatever else the stack requires.

FROM THE OBVIOUS TO THE SUBTLE

If all HyperCard did was provide fields, store graphics, and contain a programming language, it would be no different than many Mac database managers. What makes HyperCard different is the myriad

(continues)

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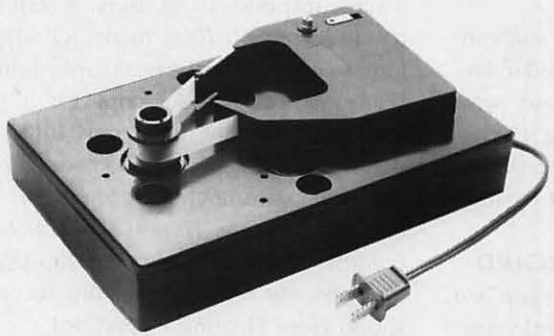
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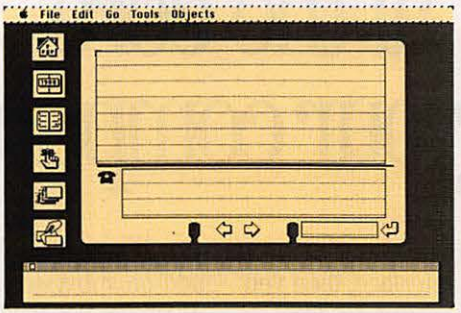
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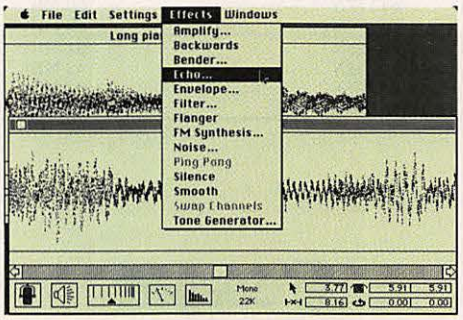
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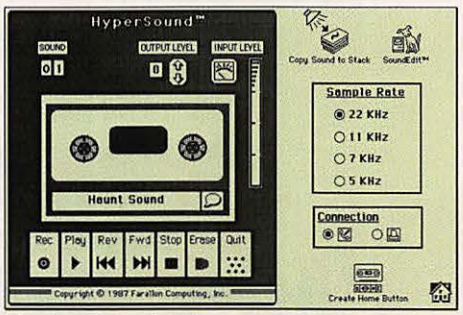
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In the Background

A stack's background holds fields, graphics, and buttons that appear on every card (in this case, HyperCard's Address stack). To view a stack's background, choose Background from the Edit menu. HyperCard displays stripes in the menu bar to indicate that you're working with the background.





Hearing HyperCard

The easiest way to record sounds for playback in HyperCard is to use Farallon Computing's $199 MacRecorder. MacRecorder's SoundEdit application (top) lets you record sounds and modify them using numerous digital effects. It graphically displays a sound's waveform; you can cut, paste, and combine pieces of sounds using the mouse and the Edit menu. MacRecorder's HyperSound stack (bottom) lets you record sounds and add them to stacks without quitting HyperCard.

ways its components can work together. Everything in HyperCard seems to have obvious applications and subtle ones.

Take buttons, for example. Their obvious use is to provide icons for moving to the next or the previous card, or for returning to the *Home* stack. (The Home stack serves as your base of operations in HyperCard—just as the Finder does for the Mac.) Navigation buttons often appear as icons, and always have HyperTalk scripts that run when the buttons are clicked (see "Navigation Buttons").

You can specify that a button not have an icon or text, but be *transparent*. By

```
on mouseUp
  push card
  visual effect barn door open
  go to card "Country Help"
end mouseUp
```



Navigation Buttons

With Activision's Business Class (shown here), you use navigation buttons to display details about the currently visible country. The buttons in the upper-left corner let you return to the Home stack, display a different country, or access Business Class's online help (its HyperTalk script is shown here).

placing transparent buttons over key portions of a graphic, you can define a relationship between each area of the graphic and other cards, fields, or stacks. Thereafter, when you click on a portion of the graphic, HyperCard will take you to a different card or stack.

Many educational stacks use this technique. One superb example is a stack called Bird Anatomy II, currently under development by Yale University's Patrick Lynch (the original Bird Anatomy is available through BMUG, Yale MUG, and Boston Computer Society). This stack combines beautifully drawn images with transparent buttons that, when clicked, display additional details on avian anatomy (see "See-Through Buttons"). On the lighter side, Amanda Stories, a delightful series of children's stacks by Amanda Goodenough uses transparent buttons to allow kids to travel through the worlds of

(continues)

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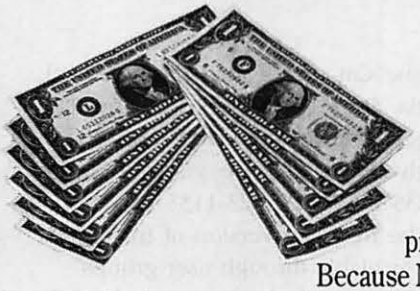


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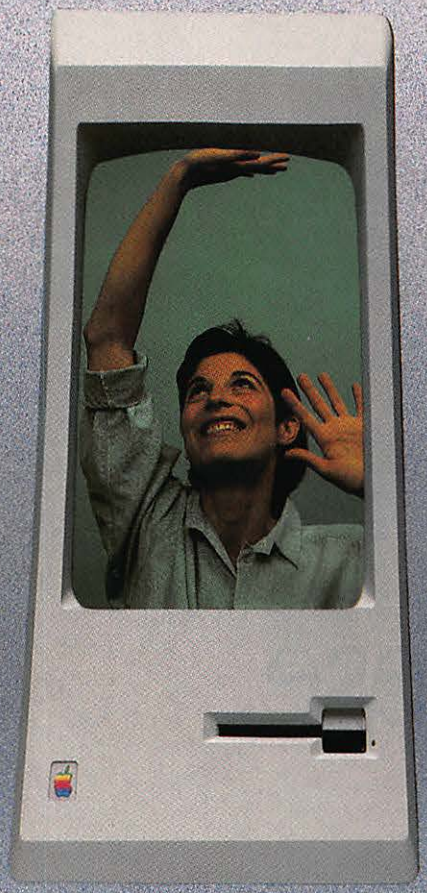
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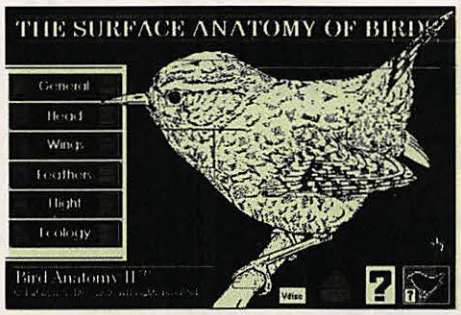
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```
on mouseUp
  set cursor to 4
  visual zoom open
  go to card "Eye and Bill-Sparrow"
end mouseUp
```





See-Through Buttons
In Patrick Lynch's Bird Anatomy II stack, transparent buttons are placed over key anatomical areas and become temporarily visible when you press ⌘-Option. Here, the Browse tool is pointing at the button whose HyperTalk script appears above the screen. Clicking this button tells HyperCard to go to the card shown at bottom, which also contains transparent buttons that, when clicked, reveal additional details.

Inigo the Cat and Your Faithful Camel. Amanda Stories are published by The Voyager Company and are available through ComputerWare via mail order (800/235-1155, 800/323-1133 in California). The freeware version of Inigo Gets Out is available through user groups.

Fields have their obvious and subtle uses. As in any database manager, they accept and store information. But they can also serve a read-only role—displaying text you can't edit—and they can be displayed or hidden using HyperTalk scripts. Combine both traits with buttons, and you have another way to convey information: *pop-up fields* that appear when you click a button (see "Pop-Up Fields").

Buttons and fields can appear on individual cards or on the background. Stack-navigation buttons are usually on the background, so they appear on each card and provide a consistent way for you to navigate. Transparent buttons that lead to other cards or display pop-up fields generally appear on individual cards and correspond to a graphic.

DESIGNING STACKS

Knowing your way around HyperCard and HyperTalk doesn't guarantee you stunning stacks. The best guide to stack design I've seen is Apple's *Stack Design Guidelines*, currently available in preliminary form from the Apple Programmer's and Developer's Association (APDA), and soon to be published by Addison-Wesley. Its nine basic guidelines provide sound advice for budding stackware authors.

■ Determine your audience. Do they have experience with computers and HyperCard? Imagine designing stacks about dinosaurs for kids and for paleon-

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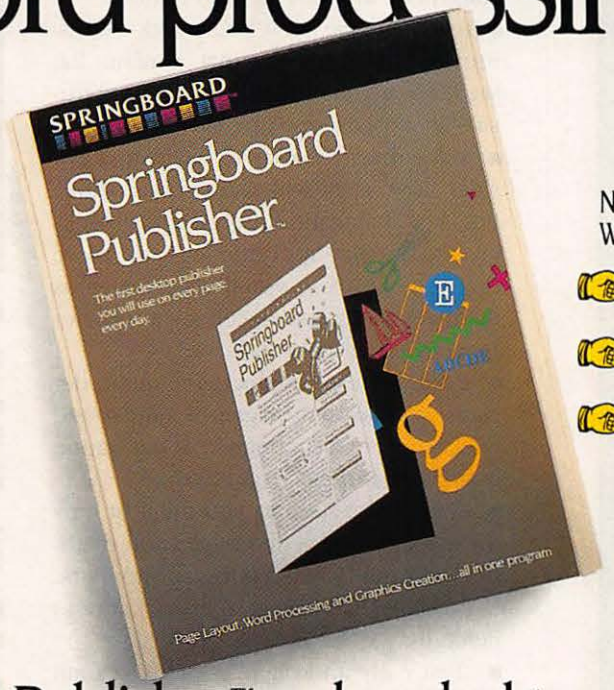
```
on mouseDown
  play "screech"
  show card field "screech owl"
end mouseDown
```





Pop-Up Fields
Shown here is another card from Bird Anatomy II. Clicking the Screech Owl button executes the HyperTalk script shown above the card, which plays back a digitized recording of a Screech Owl hooting and then displays the card field (bottom). That card field contains another HyperTalk script (not shown) that causes HyperCard to hide the field when you click within it.

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tologists. How would the stacks differ?

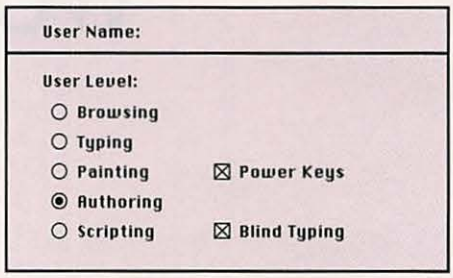
- Focus the subject matter. Decide how detailed the stack will be. From this, you'll get ideas about how to present it. Your decisions may be influenced by disk space and scheduling considerations.
- Decide how to present the subject. Doodle on paper and on screen. Solicit opinions. Consider a metaphor. A book metaphor might use a table of contents as a gateway to various cards. A videotape metaphor might use on-screen rewind, stop, play, and fast-forward buttons.
- Teach people how your stack works. Provide help screens that explain the stack's workings, but make them unobtrusive so experts won't be slowed down.
- Make the stack easy to navigate. Consider how users will access other cards. Put key navigation buttons on backgrounds so they appear in the same place on each card. Use visual effects such as dissolves and wipes to convey a sense of movement within a stack.
- Integrate text, graphics, and audio design. Avoid amateurish graphics and sound effects. Use text sparingly. Put navigation buttons near the screen edge.
- Change the stack as you think of new presentation styles and navigation methods. As Apple says, "Your goal should be to produce the best possible stack, not to defend your first beloved idea."
- Test early and often. Don't wait until the stack is done before soliciting feedback from users to find out where they—and you—are stumbling.
- When you've finished, check the stack again. Make sure there are no typographical or grammatical errors, and that all your buttons, dialog boxes, and scripts work.

SO YOU WANT TO BE AN AUTHOR

Because the best way to learn about HyperCard is to play with it, I've put together an exercise that will expose you to HyperCard customizing. For a hands-on introduction to *authoring*—Apple's term for HyperCard customizing—see "A HyperCard Tutorial."

You might think this exercise is too simple, that HyperTalk scripts are usually longer. Not so. HyperTalk is an efficient language; scripts rarely exceed 10 or 20 lines, and often have just a few. To see for yourself, explore the scripts in HyperCard's stacks (see "User Levels"). To quickly open any button's script, press ⌘ and Option while clicking on the button.

HyperTalk contains a large vocabulary, but no programming language meets every need. Knowing that, HyperTalk's designers devised a way for HyperTalk to access routines written in conventional programming languages. These *external commands (XCMDs)* and *external functions (XFCNs)* can perform specialized jobs that exceed HyperTalk's capabilities, such as controlling a videodisk player or adding custom menus to HyperCard's menu bar. Hundreds of free or inexpensive XCMDs and XFCNs are available from user groups and online information services (see "Mac HyperCard Tools," *Macworld,* September 1988). Libraries of XCMDs and XFCNs are also available from Heizer Software (415/943-7667), Clear Lake Research (713/523-7842), Softworks (203/926-1116), TechAlliance (206/251-5222), *(continues)*



Browsing: Short File and Edit menus; Browse tool only.

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Painting: Full File and Edit menus; use of all Paint tools, but not Button and Field tools. Power Keys option.

Authoring: Adds Objects menu, button and field tool use.

Scripting: Allows writing and editing of scripts; Blind Typing option.

Power Keys: Lets you issue certain paint commands by pressing a single key.

Blind Typing: Lets you type into the Message box while it's hidden.

User Levels

You can use HyperCard on any of five levels, each of which provides more access to the program's features than the preceding level.

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A HYPERCARD TUTORIAL

In this exercise, we'll exploit HyperCard's ability to start other programs by adding a button to HyperCard's Home card that, when clicked, uses a HyperTalk script to open MacWrite or the word processor of your choice. To ensure you have enough memory for this task, don't use MultiFinder. Also, you must know the exact name of your word processor as it's stored on your hard disk. If you aren't sure, return to the Finder and find out. And finally, for insurance, use the Save a Copy command to make a backup copy of your Home stack.

.

PHASE 1: Specify Your User Level

You can use HyperCard on any of five levels, each of which provides more access to HyperCard's customizing features than the one before it. To work with HyperTalk, go straight to the most powerful level: to the *scripting* level. Here's how:

1. With the Home stack open, choose Last from the Go menu to display the User Preferences card.

2. Click the Scripting button in the User Preferences card; two new menus, Tools and Objects, appear.

3. Return to the first card of the Home stack by choosing First from the Go menu.

HyperCard remembers which user level you chose, so you need only perform these steps once.

HyperCard's Tools menu contains its painting, button, and field tools (see "HyperCard's Tools"). The Objects menu lets you create, examine, and change information and scripts for buttons, fields, cards, backgrounds, and stacks.

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PHASE 2: Create the Button

Now that you have the authority to author, you can create the new button on the first card of the Home stack.

1. Choose New Button from the Objects menu. A button named New Button appears in the center of the screen.

2. Drag the button to a free area of the Home card. Don't worry about its exact position; you'll fine-tune it shortly.

.

PHASE 3: Refine the Button

Your next step is to make the button look like the other buttons in HyperCard's Home stack: icons with text below them.

1. Choose Button Info from the Objects menu, or simply double-click the new button and HyperCard's Button Info dialog box appears.

2. In the Button Name text box, type MacWrite (or your word processor's name). Because the dialog box's Show Name option is checked, the button name will appear on the card.

3. Click the Auto hilite check box. This tells HyperCard to invert the button (turn white areas black and vice versa) when you click on it. This way, the button provides visual feedback and operates like a standard Macintosh button.

4. In the Style area of the dialog box, choose the Transparent option. Don't click OK yet. When using this option to create an invisible button over a graphic, uncheck the Show Name option.

Next, you'll add an icon to the button from one of the dozens built into HyperCard.

1. In the Button Info dialog box, click the Icon button. A dialog box showing HyperCard's built-in icons appears. The icon for MacWrite is in the upper-right corner of the dialog box.

2. Select the MacWrite icon by clicking on it and then click the OK button.

The button changes to reflect its new icon. But because the button is rectangular, it obscures part of the icon.

In the next steps, you'll resize the button to see the entire icon, and you'll fine-tune the button's position.

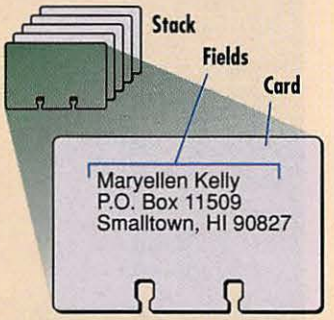
1. To resize the button, point to any of its four corners, then click and drag until the entire icon and the text below it appears.

2. Drag the button as needed to align it with any adjacent buttons.

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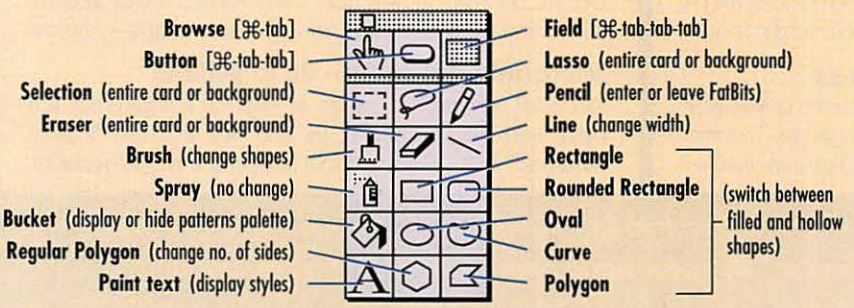
PHASE 4: Create The Script

If you click on the new button now, HyperCard highlights it, but nothing else happens. In this final phase, you'll create the HyperTalk script that tells HyperCard what to do when you click the button.



Fields, Cards, and Stacks

HyperCard presents and stores information on cards. Cards that accept information from you contain fields. A collection of related cards forms a stack.



HyperCard's Tools

HyperCard's Tools menu is the gateway to many of its painting and stack-design features. To access the secondary functions shown in parentheses, double-click on the appropriate tool. In HyperCard versions 1.2 and later, you can select the Browse, Button, and Field tools using the key commands shown in brackets.

Talk script that tells HyperCard what to do when the button is clicked.

1. Choose the button tool from the Tools menu.

2. Double-click on your new button to reopen the Button Info dialog box.

3. Click the Script button to access HyperCard's *script editor.*

A script consists of one or more *handlers.* A handler is a collection of HyperTalk statements that are executed when HyperCard receives a *message* that an event has occurred—in this case, when the new button has been pressed.

A message handler for a button always begins with on mouseUp **and ends with** end mouseUp**. The commands between these two lines tell HyperCard what to do when the mouse button is pressed and released while the browsing pointer is within the button's boundaries.**

Note that a blinking insertion point exists between the two lines. You type the script there.

1. Type (include the quotes) open "MacWrite" **(or the word processor of your choice).**

Be sure to type the name exactly as it appears in the Finder.

2. Check your work, then click OK or press Enter.

3. Choose the browse tool—the pointing finger—from the Tools menu, or from the keyboard by pressing ⌘-Tab.

Test the button now. Depending on how you've organized your disk folders, one of two things will happen: HyperCard will dutifully start the word processor, or a dialog box will appear asking where the application is stored. If the latter happens, use the dialog box to aim HyperCard in the right direction. From now on, HyperCard will look for applications in that folder. (For information on how HyperCard locates applications and stacks, see Chapter 3 in the documentation, *HyperCard User's Guide.*)

When you quit the word processor, you return to HyperCard instead of the Finder. To return to the Finder, press and hold the Option key immediately after quitting. (This tip doesn't apply to MultiFinder.)

and APDA (800/282-2732; 408/562-3959 international). And to augment HyperCard's report-printing features—which are too spartan for serious data-management stacks—consider Activision's Reports, a set of XCMDs and XFCNs for creating everything from mailing labels to inventory reports.

To learn HyperTalk, try Danny Goodman's *The Complete HyperCard Handbook* (Bantam, 1988) and *Dr. Dobb's Essential HyperTalk Handbook* by Michael Swaine (M & T Books, 1988). The best HyperTalk reference is Addison-Wesley's *HyperCard Script Language Guide* (1988). Many community colleges offer HyperCard courses, and user groups are a great source of guidance and stacks.

GO HOME

Is HyperCard a revolution? Or has it succeeded simply because it's free? I'm less impressed by HyperCard's data-management applications than I am by its education and entertainment possibilities. HyperCard is a useful data manager if you have enough memory to keep it open all the time. Otherwise, shuttling between HyperCard and other programs takes too much time.

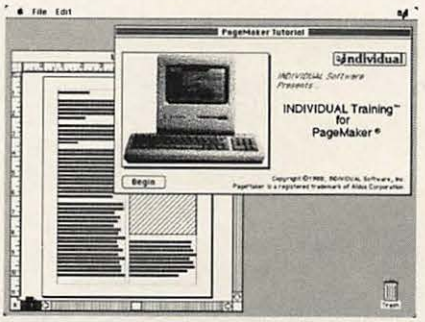
But for presenting information—as a medium for electronic publishing—HyperCard excels. And it's a boon to people who want to tinker with buttons and other aspects of the Mac interface without grappling with conventional programming.

Another way to assess HyperCard's significance might be to ask someone who has learned to read thanks to Michael Giamo's Alphabet for Adults stack (Kinko's Academic Courseware Exchange, 800/235-6919, 800/292-6640 in California, 805/652-4158 international). Developed for Drexel University's adult literacy program, this stack combines graphics and digitized sound to familiarize users with letters and words. A software wildcard that teaches adults to read: who can say that isn't revolutionary? ■

See *Where to Buy* for contact information.

Jim Heid is a Macworld *contributing editor who focuses each month on a different aspect of Mac fundamentals.*

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UPDATES

This list brings you the highlights of software updates recently received but not yet tested. The first price is the upgrade cost for registered owners; the second is the current list price.

Deluxe Music Construction Set version 2.5 has increased the number of staves from 8 to 32 on the Mac Plus or SE and to 48 on the Mac II. Program lets you place beams over rests; staccato and legato now affect MIDI playback; and text shifting doesn't occur on printout. Mac II and MultiFinder compatible; no longer copy protected. Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404; 800/245-4525. $50 with cover of manual if you have DMCS 1.0; $30 plus instrument disk if you have DMCS 2.0; $129.95 new.

DiskFit and Network DiskFit version 1.5 run up to two times faster than previous version under both Finder and MultiFinder. You can select other applications while DiskFit is backing up files. Shut Down and Restart commands are no longer ignored if DiskFit is processing a backup. DataForm file has been eliminated from Tape Drive. SuperMac Software, P.O. Box 390725, Mountain View, CA 94039; 415/964-8884. Free if originally purchased after December 15, 1988; otherwise $20. DiskFit $99.95 new; Network DiskFit $395.

Display AdBuilder version 1.1 lets you merge ads into layouts and create dashed boxes and rules. Preference dialog box lets you customize Display AdBuilder software for individual needs. Other features include word processor, handles on measures, boxes, and rules; and a built-in virus checker. Digital Technology, 500 W. 1200 S, Orem, UT 84058; 801/226-2984. $100 per workstation; $4995 new. $14,295 including Mac II, extended keyboard, monitor, and 4MB memory. SE version $9795.

HyperAnimator version 1.5 is MultiFinder compatible. Program detects when a system is operating in color mode and presents a Control Panel to change color; lets you save actors to and delete actors from the Home stack; and lets you copy one or all expressions for a particular facial feature when creating animated actors. Bright Star Technology, 14450 N.E. 29th Pl., #220, Bellevue, WA 98007; 206/885-5446. $29.95; $149.95 new.

LapLink Mac version 2.0 adds a series of file translators for Mac- and PC-compatible computers that convert word processing files into MacWrite and Microsoft Word Macintosh formats. Program can link any model IBM-compatible PC with any Mac. Supports Mac binary files. Traveling Software, 18702 N. Creek Pkwy., Bothell, WA 98011; 206/483-8088. Free; $139.95 new.

MacFortran and MacFortran/020 version 2.4 support additional VAX/VMS extensions and include new documentation. MacFortran now requires 1MB RAM. MacFortran/020 now includes COMPLEX*16, the MIL-STD-1753 extensions, and IEEE-P754 math, and includes code generators for 68020/68881 and 68030/68882 systems. Absoft, 2781 Bond St., Auburn Hills, MI 48057; *(continues)*

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313/853-0050. $50 plus s/h each. MacFortran owners wishing to upgrade to MacFortran/020 are eligible for $100 credit. MacFortran $295 new. MacFortran/020 $95 new.

MacHotel version 3.3 performs automatic night audit reporting and vacant-room assignment, has basic accounting controls, cash and credit limit warnings, data import/export, and guest and corporate aging reports. Lone Oak Software, P.O. Box 21-097, Eagan, MN 55121; 612/920-3115. Free; single user (includes Omnis 3 Plus Runtime) $1195 new; multiuser (includes Omnis 3 Plus library only) $1495 new; demo version $30.

Mac3270 version 2.0 supports coaxial boards, protocol converters, Kermit file-transfer protocol, complete keyboard mapping, color, SIM/XFR file-transfer protocol. Includes tear-off key pads. Simware, 20 Colonnade Rd., Ottawa, Ontario, Canada K2E 7M6; 613/727-1779. Async version free; $250 new. Credit available toward upgrade to master version; $325 new.

Professional Composer version 2.3 adds three fonts for Best Quality Printing option on the ImageWriter and two for Best Quality Printing option on the ImageWriter LQ. Lets you put ornaments and articulation on every note in a region, and draws all slurs, ties, crescendos, and decrescendos in PostScript. Mark of the Unicorn, 222 Third St., Cambridge, MA 02142; 617/576-2760. Free; $495 new.

TML Pascal II version 2.0 includes MPW software and documentation and supports Apple's Symbolic Application Debugging Environment (SADE) and MacApp version 2.0. Supports Object Pascal, Data Structures larger than 32K, optional assembly-code generation, and 68881/68882 and 68020/68030 code generation. TML Systems, 8837-B Goodbys Executive Dr., Jacksonville, FL 32217; 904/636-8592. $79.95; $195 new.

TOPS/Mac version 2.1 supports System 6.0.2 and Apple LaserWriter drivers 5.0 and 5.2 for the LaserWriter IINT and IINTX. Has expanded library of file-translation options for importing files, and permits you to select a group of files for translation. Sun Microsystems/Tops Division, P.O. Box 4020, Concord, CA 94524-4020; 800/627-5858 in the United States, 800/841-2345 in Canada. $30 per site for Mac only, $45 per site for Mac/PC combination for users of version 2.0, $49 per node; $249 per node new.

VersaTerm version 4.0, **VersaTerm-Pro** version 3.0 support Kermit server mode, text translation; hierarchical menus. Programmable extended keyboard function/auxiliary keys, color support for text attributes, and command macros can be created and executed dynamically from the host. Peripherals, Computers & Supplies, 2457 Perkiomen Ave., Reading, PA 19606; 215/779-0522. $20 each, plus manual cover; VersaTerm $149 new; VersaTerm-Pro $295 new.

Virex version 1.2 combats two additional viruses: INIT29, which has the ability to infect disks as soon as they are inserted into the computer; and the Hpat, which is a renamed variation of nVIR. HJC Software, P.O. Box 51816, Durham, NC 27717; 919/490-1277. $15 if originally purchased before December 22, 1988; otherwise free.

To have products listed in this section, send upgraded software, an outline of major changes since the previous release, upgrade price, suggested retail price, company name, mailing address, and phone number to Updates, Macworld, *501 Second St., San Francisco, CA 94107.*



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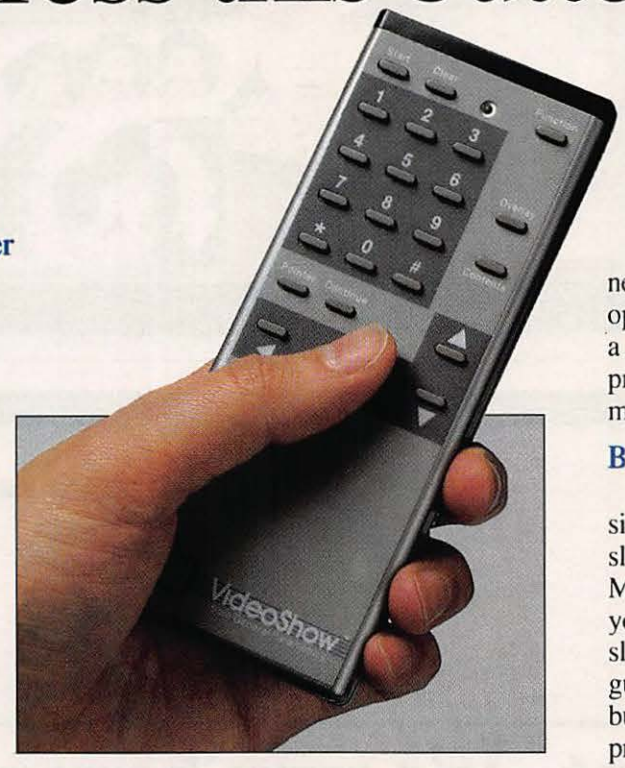


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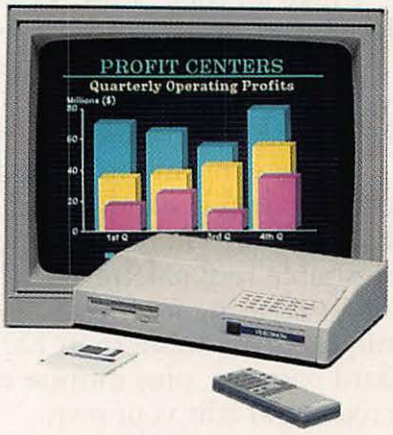
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WHERE TO BUY

This listing provides company addresses and phone numbers for products mentioned in this issue. Allow several weeks for responses to Reader Service Card inquiries. Asterisks indicate vendors who prefer to be contacted by phone.

Reader Service

A

750 **Abaton 300/FB, 300 S** Abaton, 48431 Milmont Dr., Fremont, CA 94538; 415/683-2226.

751 **Adobe Illustrator 88** Adobe Systems, Inc., P.O. Box 7900, Mountain View, CA 94039-7900; 415/961-4400, 800/833-6687.

752 **Aldus FreeHand** Aldus Corp., 411 First Ave. S, Seattle, WA 98104; 206/622-5500.

753 **Aldus Persuasion** Aldus Corp., 411 First Ave. S, Seattle, WA 98104; 206/622-5500.

754 **Alphabet for Adults** Michael Giamo/Drexel University, Kormar Ctr., #127, Philadelphia, PA 19104; 215/895-6621.

755 **Amanda Stories** The Voyager Company, 1351 Pacific Coast Hwy., Santa Monica, CA 90401; 213/451-1383.

756 **Andrew Tobias Managing Your Money** Meca Ventures, Inc., 355 Riverside Ave., Westport, CT 06880; 203/226-2400.

757 **APL-800WD** ADIC, 14737 N.E. 87th St., P.O. Box 2996, Redmond, WA 98073-2996; 206/881-8004, 800/336-1233.

Reader Service

758 **Apple High-Resolution Monochrome Monitor** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

759 **Apple Scanner** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

760 **Aussie Joker Poker** Mindscape, Inc., 3444 Dundee Rd., Northbrook, IL 60062; 312/480-7667, 800/221-9884.

B

761 **The Big Picture, The Big Picture Z21 IQ** E-Machines Inc., 9305 S.W. Gemini Dr., Beaverton, OR 97005; 503/646-6699.

762 **Business Class** Mediagenic, 3885 Bohannon Dr., Menlo Park, CA 94025; 415/329-0800.

C

763 **Cirrus drives** La Cie, Ltd., 16285 S.W. 85th, #306, Tigard, OR 97224; 503/684-0143.

764 **ConvertUnits** GraphicText Applications, Inc., 815 Princess Ave., Vancouver, B.C., Canada V6A 3E5; 604/255-8077.

765 **Copy II Mac** Central Point Software, Inc., 15220 Greenbrier Pkwy., #200, Beaverton, OR 97006; 503/690-8090.

766 **Cricket Draw** Cricket Software, Inc., 40 Valley Stream Pkwy., Malvern, PA 19355; 215/251-9890.

767 **Cricket Presents** Cricket Software, Inc., 40 Valley Stream Pkwy., Malvern, PA 19355; 215/251-9890.

Reader Service

D

768 **Datacell 90** Giga Cell Systems, 4201 Burton Dr., Santa Clara, CA 95054; 408/727-1049, 800/832-8268.

769 **Datacopy JetReader, Datacopy 730, Datacopy 730GS, Datacopy 830, Datacopy 840** Xerox Imaging Systems, 1215 Terra Bella Ave., Mountain View, CA 94043; 415/965-7900, 800/821-2898.

770 **Digital Darkroom** Silicon Beach Software, Inc., P.O. Box 261430, San Diego, CA 92126; 619/695-6956.

771 **DirectDrive drives** Jasmine Technologies, Inc., 1740 Army St., San Francisco, CA 94124; 415/282-1111.

772 **DualPage** Cornerstone Technology, Inc., 1883 Ringwood Ave., San Jose, CA 95131; 408/279-1600, 800/562-2552.

E

773 **Exstatix** Select Micro Systems, Inc., 40 Triangle Center, #211, Yorktown, NY 10598; 914/245-4670.

F

* **The Fellowship of the Ring** Addison-Wesley Publishing Co., Rte. 128/Jacob Way, Reading, MA 01867; 617/944-3700.

774 **FI/80, FX/80 hard disks** GCC Technologies, 580 Winter St., Waltham, MA 02154; 617/890-0880, 800/634-9737.

Reader Service

775 **Focal Point II** Mediagenic, 3883 Bohannon Dr., Menlo Park, CA 94025; 415/329-0800.

776 **Font/DA Juggler Plus** ALSoft, Inc., P.O. Box 927, Spring, TX 77383-0927; 713/353-4090.

777 **FontDisplay** Jeffrey Shulman, P.O. Box 521, Ridgefield, CT 06877-0521; 203/792-1521.

778 **FontLiner** Taylored Graphics, P.O. Box 1900, Freedom, CA 95019-1900; 408/761-2481.

779 **Fontographer** Altsys Corp., 720 Avenue F, #109, Plano, TX 75074; 214/424-4888.

780 **FontSizer** U.S. MicroLabs, Inc., 1611 Headway Cir., Bldg. 3, Austin, TX 78754; 512/339-0001, 800/552-7654.

G

781 **GraphistPaint II** Aba Software Inc., 41 Great Valley Pkwy., Malvern, PA 19355; 215/644-3580, 800/234-0230.

H

782 **Hammer 91** FWB, Inc., 2040 Polk St., #215, San Francisco, CA 94109; 415/474-8055.

783 **HighScan 400, HighScan 600, HighScan 800** Siemens Information Systems, 240 E. Palais Rd., Anaheim, CA 92805; 714/991-2020.

* **The Hobbit** Addison-Wesley Publishing Co., Route 128/Jacob Way, Reading, MA 01867; 617/944-3700.

784 **HyperCard** Apple Computer,

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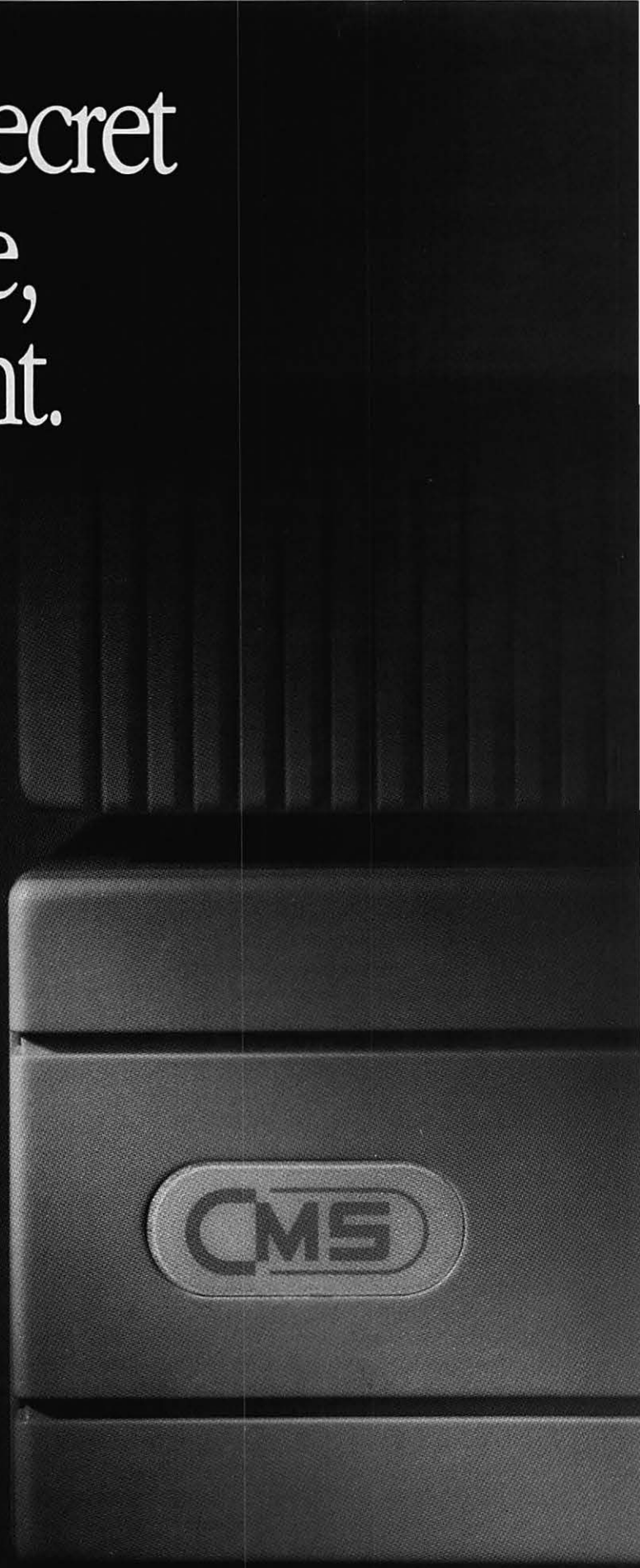
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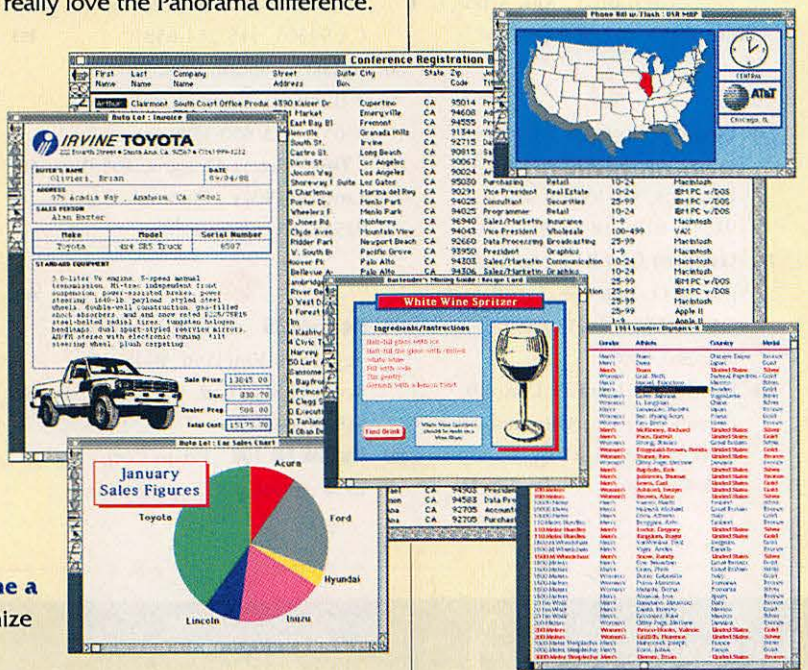
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Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

785 **Hyper Mac Subjects, Hyper Mac Subjects Combined Index, Hyper Mac Subjects with Hyper Mac Subjects Combined Index** Pointer Publications, 935 Brooksglen Dr., Roswell, GA 30075; 404/587-1844.

786 **HyperTutor** Power Up Software Corp., 2929 Campus Dr., San Mateo, CA 94403; 415/345-5900, 800/223-1479.

I

787 **ImageStudio** Letraset USA, 40 Eisenhower Dr., Paramus, NJ 07653; 201/845-6100, 800/526-9703.

788 **Impact 80** Everex Systems, 48431 Milmont Dr., Fremont, CA 94538; 415/498-1111, 800/821-0806.

789 **InnerDrive 100** Jasmine Technologies, Inc., 1740 Army St., San Francisco, CA 94124; 415/282-1111.

790 **Integra 80** Dolphin Systems Technology, 1701 E. Edinger Ave., Bldg. G, Santa Ana, CA 92705; 714/558-3220.

• **Irwin 5080 Tape Backup Drive** Irwin Magnetics, 2101 Commonwealth Blvd., Ann Arbor, MI 48105; 313/930-9000.

L

791 **Laser FX** Postcraft International, Inc., 27811 Avenue Hopkins, #6, Valencia, CA 91355; 818/718-1598.

792 **LaserPaint Color II** LaserWare, Inc., P.O. Box 668, San Rafael, CA 94915; 415/453-9500, 800/367-6898.

793 **LetraStudio** Letraset USA, 40 Eisenhower Dr., Paramus, NJ 07653; 201/845-6100, 800/526-9703.

794 **LetrTuck** EDCO Services, Inc., 12410 N. Dale Mabry Hwy., Tampa, FL 33618; 813/962-7800, 800/523-8973.

795 **Liberty drives** Liberty Systems, Inc., 120 Saratoga Ave., #82, Santa Clara, CA 95051; 408/983-1127.

796 **LightningScan** Thunderware, Inc., 21 Orinda Way, Orinda, CA 94563; 415/254-6581.

797 **LP Text** London Pride, Inc., 1 Birch St., Norwalk, CT 06851; 203/866-4806.

798 **L View** Sigma Designs, 46501 Landing Pkwy., Fremont, CA 94538; 415/770-0100.

M

799 **MacCrate 80** Crate Technology, 6850 Vineland, Bldg. M, North Hollywood, CA 91605; 818/766-4001.

800 **MacDisk EM 100** Priam Corp., 20 W. Montague Expwy., San Jose, CA 95134-2085; 408/434-9300, 800/227-2917.

801 **MacImage** Xerox Imaging Systems, 1215 Terra Bella Ave., Mountain View, CA 94043; 415/965-7900.

802 **MacinStor 90 ZFP** Storage Dimensions, 2145 Hamilton Ave., San Jose, CA 95125; 408/879-0300.

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804 **MacKern** ICOM Simulations, Inc., 648 S. Wheeling Rd., Wheeling, IL 60090; 312/520-4440.

805 **MacRecorder** Farallon Computing, 2150 Kittredge St., Berkeley, CA 95709; 415/849-2331.

806 **MacScan, MacScan Pro** New Image Technology, Inc., 9701 Philadephia Ct., Lanham, MD 20706; 301/731-2000.

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807 **MacStack SD81U** CMS Enhancements, Inc., 1372 Valencia Ave., Tustin, CA 92680; 714/259-9555.

808 **MagicDrive 91** MacProducts USA, 8303 Mopac Expwy., #218, Austin, TX 78759-8369; 512/343-9441, 800/622-3475.

809 **MathType** Design Science, Inc., 6475-B E. Pacific Coast Hwy., Long Beach, CA 90803; 213/433-0685.

810 **Max-15** Princeton Graphic Systems, 601 Ewing St., Bldg. A, Princeton, NJ 08540; 609/683-1660.

811 **MegaScreen monitors** MegaGraphics, Inc., 439 Calle San Pablo, Camarillo, CA 93010; 818/484-3799.

* **Microsoft Word** Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; 206/882-8080, 800/426-9400.

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812 **Mirage I Display System** IDT Systems, Inc., 2 Bronxville Rd., #1E, Bronxville, NY 10708; 914/779-2848.

813 **Mirus FilmPrinter** Mirus Corp., 4301 Great America Pkwy., Santa Clara, CA 95054; 408/980-9770, 800/654-0808.

814 **Modern Artist** Computer Friends, Inc., 14250 N.W. Science Park Dr., Portland, OR 97229; 503/626-2291, 800/547-3303.

815 **More II** Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014; 408/253-9600.

816 **MS-91** MicroNet Technology, Inc., 13765-A Alton Pkwy., Irvine, CA 92718; 714/837-6033.

817 **MS 300A, MSF 300A, MSF 300C, MSF 300G/GS, MSF 300Q/QS, MSF 400G/GS** Microtek Lab, Inc., 16901 S. Western Ave., Gardena, CA 90247; 213/321-2121, 800/654-4160.

Reader Service

N

818 **Nova 80** Microtech International, Inc., 29 Business Park Dr., Branford, CT 06405; 203/488-7744, 800/626-4276.

819 **NuPaint** NuEquation, Inc., 1701 N. Greenville Ave., #703, Richardson, TX 75081; 214/699-7747.

820 **Nutmeg 19, Nutmeg/Xerox Full Page Display** Nutmeg Systems, Inc., 25 South Ave., New Canaan, CT 06840; 203/966-3226.

O

821 **OME100 drives** Open Mac Enterprises, 2280 Bates Ave., Ste. J, Concord, CA 94520; 415/682-0440.

822 **100 Plus** Rodime, Inc., 851 Broken Sound Pkwy., Boca Raton, FL 33431; 407/994-5585.

Reader Service

823 **1000 RX** Rodime, Inc., 851 Broken Sound Pkwy., Boca Raton, FL 33431; 407/994-5585.

P

824 **PageView** Sigma Designs, 46501 Landing Pkwy., Fremont, CA 94538; 415/770-0100.

825 **Panorama** ProVue Development Corp., 15180 Transistor Ln., Huntington Beach, CA 92649; 714/969-2431.

826 **PC Scan 1000, PC Scan 1020, PC Scan 2020, PC 2000** Dest Corp., 1201 Cadillac Ct., Milpitas, CA 95035; 408/946-7100.

827 **PhotoMac** Data Translation, Inc., 100 Locke Dr., Marl-

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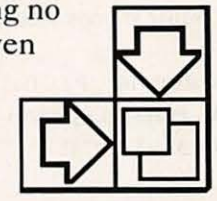
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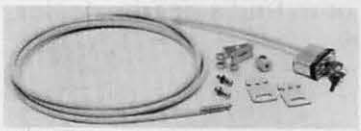


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borough, MA 01752; 508/481-3700.

828 **Photon 80** Warp Nine Engineering, 2644 Patton Rd., Roseville, MN 55113; 612/633-4450.

* **Photon Paint** MicroIllusions, 17408 Chatsworth St., Granada Hills, CA 91344; 818/360-3715, 800/360-3715.

829 **Pixelmaster** Howtek, Inc., 21 Park Ave., Hudson, NH 03051; 603/882-5200.

* **PixelPaint, PixelPaint Professional** SuperMac Technology, 295 N. Bernardo Ave., Mountain View, CA 94043; 415/964-8884.

830 **Platinum 100** CMS Enhancements, Inc., 1372 Valencia Ave., Tustin, CA 92680; 714/259-9555.

* **PLI 100 External Turbo** Peripheral Land, Inc., 47800 Westinghouse Dr., Fremont, CA 94538; 415/657-2211.

831 **Pocket Hammer 80** FWB, Inc., 2040 Polk St., #215 San Francisco, CA 94109; 415/474-8055.

832 **PostScript Typeface Sampler** MacTography, 702 Twinbrook Pkwy., Rockville, MD 20851; 301/424-3942.

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833 Adobe Systems, Inc., P.O. Box 7900, Mountain View, CA 94039-7900; 415/961-4400, 800/833-6687.

834 Allotype Typographics, 1600 Packard Rd., #5, Ann Arbor, MI 48104; 313/663-1989.

835 Alphabets, Inc., P.O. Box 5448, Evanston, IL 60204-5448; 312/328-2733.

836 Altsys Corp., 720 Avenue F, #109, Plano, TX 75074; 214/424-4888.

837 Bitstream, Inc., 215 First St., Cambridge, MA 02142; 617/497-6222.

838 Casady & Greene, Inc., P.O. Box 223779, Carmel, CA 93922; 408/624-8716, 800/331-4321.

839 Caseys' Page Mill, 6528 S. Oneida Ct., Englewood, CO 80111; 303/220-1463.

840 Coda Music Software, 1401 E. 79th St., Bloomington, MN 55425; 612/854-1288, 800/843-2066.

841 Compugraphic Corp., 200 Ballardvale St., Wilmington, MA 01887; 617/658-5600.

842 Design Science, Inc., 6475-B E. Pacific Coast Hwy., Long Beach, CA 90803; 213/433-0685.

843 Devonian International Software Co., P.O. Box 2351, Montclair, CA 91763; 714/621-0973.

844 Dubl-Click Software, Inc., 9316 Deering, Chatsworth, CA 91311; 818/349-2758.

845 Eastern Language Systems, 39 West 300 North, Provo, UT 84601; 801/377-4558.

* Ecological Linguistics, P.O. Box 15156, Washington, DC 20003; 202/546-5862.

846 EmDash, P.O. Box 8256, Northfield, IL 60093; 312/441-6699.

847 The Font Company, 4101 E. Larkspur Dr., Phoenix, AZ 85032; 602/996-6606.

848 Font World, 2021 Scottsville Rd., Rochester, NY 14623-

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849 Image Club Graphics, 1902 11th St., #5, Calgary, Alberta, Canada T2G 3G2; 403/262-8008, 403/261-7013.

850 Judith Sutcliffe: The Electric Typographer, 2216 Cliff Dr., Santa Barbara, CA 93109; 805/966-7563.

851 Linguists Software, 925 Hindley Ln., Edmonds, WA 98020; 206/775-1130.

852 Linotype Co., 425 Oser Ave., Hauppage, NY 11788; 800/645-5764.

853 MacTography, 702 Twinbrook Pkwy., Rockville, MD 20851; 301/424-3942.

854 Monotype Typography-USA, 600 W. Cummings Park, #1800, Woburn, MA 01801; 617/933-2570.

* NeoScribe International, P.O. Box 633-UD, East Haven, CT 06512; 203/467-9880.

855 Olduvai Corp., 7520 Red Rd., Ste. A, South Miami, FL 33143; 305/665-4665, 800/822-0772.

856 Page Studio Graphics, 3175 N. Price Rd., #1050, Chandler, AZ 85224; 602/839-2763.

857 Springboard Software, Inc., 7808 Creekridge Cir., Minneapolis, MN 55435; 800/654-6301.

858 Studio 231, 231 Bedford Ave., Bellmore, NY 11710; 516/785-4422.

859 T/Maker Co., 1390 Villa St., Mountain View, CA 94041; 415/962-0195.

860 Varityper, 11 Mt. Pleasant Ave., East Hanover, NJ 94545; 201/887-8000.

* **PowerPoint** Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; 206/882-8080, 800/426-9400.

Q

861 **QMS ColorScript 100** QMS, Inc., 1 Magnum Pass, Mobile, AL 36618; 205/633-4300, 800/631-2692.

R

862 **Radius Full Page Display, Radius Two Page Display System** Radius, Inc., 404 E. Plumeria Dr., San Jose, CA 95134; 408/434-1010.

863 **Relax Plus drives** Relax Technology, 3101 Whipple Rd., #22, Union City, CA 94587; 415/471-6112, 800/848-1313.

S

864 **ScanJet, ScanJet Plus** Hewlett-Packard, 19310 Pruneridge Ave., Cupertino, CA 95014; 800/752-0900.

865 **ScanMan** Logitech, Inc., 6505 Kaiser Dr., Fremont, CA 94555; 800/231-7717.

866 **Scanmaster** Howtek, Inc., 21 Park Ave., Hudson, NH 03051; 603/882-5200.

867 **Shadow 80** Mirror Technologies, Inc., 2644 Patton Rd., Roseville, MN 55113; 612/633-4450.

* **The Shadows of Mordor** Addison-Wesley Publishing Co.,

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868 **Sharp JX-450 Color Scanner** Sharp Electronics Corp,. P.O. Box 650, Sharp Plaza, Mahwah, NJ 07430; 201/529-8979, 800/526-0264.
Shufflepuck Cafe Brøderbund Software, Inc., 17 Paul Dr., San Rafael, CA 94903-2101; 415/492-3200, 800/527-6263.

869 **SilverView monitors** Sigma Designs, 46501 Landing Pkwy., Fremont, CA 94538; 415/770-0100.

* **Spectrum/8 monitors** SuperMac Technology, 295 N. Bernardo Ave., Mountain View, CA 94043; 415/964-8884.

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872 **Studio/8, Studio/32** Electronic Arts, P.O. Box 7530, San Mateo, CA 94403; 415/571-7171, 800/245-4525.

873 **SuperMasterFile** New Edge, Inc., Noone Falls, Peterborough, NH 03458; 603/924-6100, 800/284-3330.

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874 **Taxan Crystal View** Taxan USA Corp., 161 Nortech Pkwy., City of Industry, CA 95134; 818/810-1291.

875 **Tektronix 4693D** Tektronix, Inc., P.O. Box 1000, Mail Stop 63-447, Wilsonville, OR 97070; 503/627-7111, 800/225-5434.

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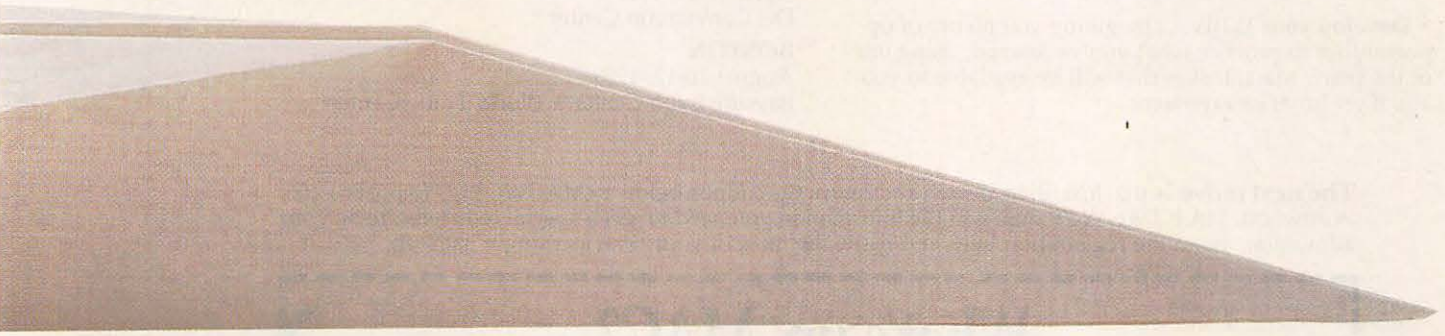
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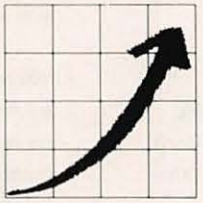
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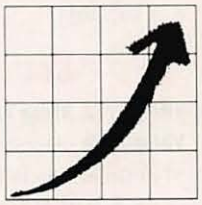
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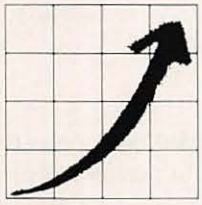


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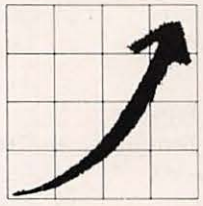


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PRODUCT INDEX

READER SERVICE NUMBER

Software

BUSINESS
— Adobe Systems, Inc., 74
306 Aldus Persuasion, 34-35
49 allan bonadio & assoc., 76
220 Ashton-Tate, 24-25
187 Berkeley Systems Design, Inc., 248
— Checkmark Software, 250
— Claris Corp., 42-43, 104
155 Dubl-Click, 242
152 Fox Software, 256
156 Great Plains Software, 227
167 Individual SW, 253
360 Informix Software, 100-101
— Intuit, 199
94 Mainstay, 27
33 Mansfield Systems, 67
— Microsoft, IFC-1
87 Monogram, 208
160 M/H Group, 92
— Oracle, 21
51 Peat Marwick Advanced Technology, 281
42 Personal Training Systems, 185
297 Power Up, 203
237 Symantec, 7
491 Systat, 44
492 Systat, 44
332 T/Maker, IBC

VERTICAL
— Adobe Systems, Inc., 74
49 allan bonadio & assoc., 76
— Checkmark Software, 250
— Intuit, 199
374 MicroSpot, 38

DATA MANAGEMENT
— Oracle, 21
42 Personal Training Systems, 185
451 ProVue, 263

WORD PROCESSING
220 Ashton-Tate, 24-25
— Claris Corp., 42-43
472 Lexpertise USA, Inc., 218
215 Symantec, 15
332 T/Maker, IBC

CAD/CAM
459 Berol USA, 219
12 Engineered Software, 8
77 Graphsoft, 210
34 MathSoft, 223
374 MicroSpot, 38

COMMUNICATION
371 Compuserve, 267
281 Dataviz, 96
286 Synergy Software, 74
— Tops, 23

HYPERCARD
302 Symmetry, 230

EDUCATIONAL
472 Lexpertise USA, Inc., 218
42 Personal Training Systems, 185

FONTS
16 Casady & Greene Inc., 33
137 Casady & Greene Inc., 33

GRAPHICS/DESKTOP PUBLISHING
— Adobe Systems, Inc., 74
306 Aldus Persuasion, 34-35
35 Altsys, 66
425 Caere Corp, 255
16 Casady & Greene Inc., 33
137 Casady & Greene Inc., 33
400 CTA, 98
217 Deneba Software, 39
155 Dubl-Click, 242
124 GW Instruments, Inc., 20
472 Lexpertise USA, Inc., 218
33 Mansfield Systems, 67
435 Metro Image Base, Inc., 54
393 NuEquation, 259
213 Paracomp, 108
297 Power Up, 203
295 Quark, 192
115 Qume, 232-233
353 Qume, 232-233
185 Springboard Software, Inc., 249
215 Symantec, 15

PERSONAL BUSINESS/HOME
— Intuit, 199
297 Power Up, 203
112 Survivor Software, 53

ENTERTAINMENT
134 Casady & Greene Inc., 86
138 PCAI, 89
266 Silicon Beach Software, 110
358 Spectrum Holobyte, 197

NETWORKING
371 Compuserve, 267
160 M/H Group, 92
421 Shiva Corp., 5
— Tops, 23

LANGUAGES DEVELOPMENT SYSTEMS
23 Language Systems, Inc., 80

UTILITIES
202 ALSoft, Inc., 4
187 Berkeley Systems Design, Inc., 248
357 Central Point, 228
439 GDT Softworks, Inc., 54
261 Kent Marsh Ltd, 190
366 Microseeds, 28
284 Olduvai Corp, 60
317 Preferred Publishers, Inc., 220
237 Symantec, 7

MISCELLANEOUS
306 Aldus Persuasion, 34-35
— Checkmark Software, 250
439 GDT Softworks, Inc., 54

Hardware

COMPUTER SYSTEMS
4 Cambridge North America, 282

PRINTERS
— Compugraphic Corp., 173-175
177 GCC Technologies, 9
344 Hewlett Packard, 216-217
254 Howtek, 268-269
102 Jasmine Technologies, Inc., 201
125 Jasmine Technologies, Inc., 204-205
65 Mitsubishi, 40
265 Orange Micro, 28
104 QMS, Inc., 186-187
115 Qume, 232-233
353 Qume, 232-233
93 Varityper, 30-31

BOARDS
1 Air Land Systems, 247
403 American Micro , 234
127 Clearpoint, 214
375 Clearpoint, 214
477 DayStar Digital, 22
174 Dove, 242
82 Irwin Magnetics, 188
161 Micron Technology, 84
585 Microtek, 114
413 Mobius Technologies, 247
196 National Semiconductor, 235
347 Novell, 62-63
13 RasterOps, 55
— SuperMac Technology, 90
445 Truevision, 29

Digitizers/Scanners
425 Caere Corp, 255
242 Digital Vision, 230
19 Forefront Graphics, 64
585 Microtek, 114
176 Thunderware, 6

DISPLAY
101 E-Machines, 264-265
354 Mac Friends, 246
65 Mitsubishi, 40
46 Radius, Inc., 16-17
117 Sigma, 10-11
24 Taxan USA Corp., 93

MODEMS
61 Computer Friends, 244
383 Hayes, 112-113
469 Ven-Tel, 58

HARD DISKS/STORAGE
403 American Micro, 234
3 Archive Corp, 36
85 CMS Enhancements, 262
233 Corel Systems, 206
17 Cutting Edge, Inc., 231
452 Ehman Engineering, Inc., 94
110 Everex, 52
440 Hard Drives Int'l., 271
471 Irwin Magnetics, 61
457 Jasmine Technologies, Inc., 82-83
21 Jasmine Technologies, Inc., 12
145 LaCie Ltd., 18
354 Mac Friends, 246
387 Maxcess, 8
275 Micronet Technology, 251
458 Microtech International, 77
243 Microtech International, 75
43 Mirror Technologies, 78-79
58 Mirror Technologies, 78-79
424 Mirror Technologies, 78-79
223 Personal Computer Peripherals Corp., 56-57
149 Rodime, 229
— Seagate, 245
414 Storage Dimensions, 183
455 SuperMac Technology, 91
321 Tecmar Inc., 194

VIDEO
467 General Parametrics, 260
— Magnavox, 72
13 RasterOps, 55

MISCELLANEOUS
144 Adaptec, Inc., 102
401 Advanced Gravis, 255
403 American Micro, 234
61 Computer Friends, 244
186 Sun Remarketing, 81
26 Trimar USA, Inc., 234
22 Tri-Data, 41
27 VeloBind, 221
267 Zericon, 222

EXPANSIONS/UPGRADES
161 Micron Technology, 84

SOFTWARE SECURITY DEVICES
106 Rainbow Technologies, 88

Accessories

FLOPPY DISKS/HOLDERS
479 BASF, 224

FURNITURE
— Anthro, 26
296 ScanCo, 87

MISCELLANEOUS
401 Advanced Gravis, 255
61 Computer Friends, 244
30 Kensington Microware Ltd., 106-107
192 Kensington Microware Ltd., BC
276 MicroComputer Accessories, Inc., 263
239 Secure-It, 266
29 Secure-It, 26
— 3M Visual Products, 179

SERVICES
195 GE Rental/Lease, 181
406 MacAcademy, 65
— Prix Ars Electronica, 266

Mail Order

5 Beverly Hills Computer, 276-277
32 CDA, 280
562 Diskette Connection, 274
368 Dr Mac Inc, 279
354 Mac Friends, 246
449 Mac Zone, The, 68-71
— MacConnection, 116-123
264 MacLand, 278
465 MacProducts USA, 222
86 MacProducts USA, 212
78 MacWarehouse, 236-241
45 Open Mac, 274
44 Programs Plus, 46-51
— Software Library, 275
54 USA Flex/Comark, 275

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(1-200)

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200

(201-400)

201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230
231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260
261	262	263	264	265	266	267	268	269	270
271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290
291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310
311	312	313	314	315	316	317	318	319	320
321	322	323	324	325	326	327	328	329	330
331	332	333	334	335	336	337	338	339	340
341	342	343	344	345	346	347	348	349	350
351	352	353	354	355	356	357	358	359	360
361	362	363	364	365	366	367	368	369	370
371	372	373	374	375	376	377	378	379	380
381	382	383	384	385	386	387	388	389	390
391	392	393	394	395	396	397	398	399	400

(401-600)

401	402	403	404	405	406	407	408	409	410
411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426	427	428	429	430
431	432	433	434	435	436	437	438	439	440
441	442	443	444	445	446	447	448	449	450
451	452	453	454	455	456	457	458	459	460
461	462	463	464	465	466	467	468	469	470
471	472	473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	488	489	490
491	492	493	494	495	496	497	498	499	500
501	502	503	504	505	506	507	508	509	510
511	512	513	514	515	516	517	518	519	520
521	522	523	524	525	526	527	528	529	530
531	532	533	534	535	536	537	538	539	540
541	542	543	544	545	546	547	548	549	550
551	552	553	554	555	556	557	558	559	560
561	562	563	564	565	566	567	568	569	570
571	572	573	574	575	576	577	578	579	580
581	582	583	584	585	586	587	588	589	590
591	592	593	594	595	596	597	598	599	600

CATALOG INFORMATION

601	602	603	604	605	606	607	608	609	610
611	612	613	614	615	616	617	618	619	620
621	622	623	624	625	626	627	628	629	630
631	632	633	634	635	636	637	638	639	640
641	642	643	644	645	646	647	648	649	650
651	652	653	654	655	656	657	658	659	660
661	662	663	664	665	666	667	668	669	670
671	672	673	674	675	676	677	678	679	680
681	682	683	684	685	686	687	688	689	690
691	692	693	694	695	696	697	698	699	700
701	702	703	704	705	706	707	708	709	710
711	712	713	714	715	716	717	718	719	720
721	722	723	724	725	726	727	728	729	730
731	732	733	734	735	736	737	738	739	740
741	742	743	744	745	746	747	748	749	750

WHERE TO BUY

751	752	753	754	755	756	757	758	759	760
761	762	763	764	765	766	767	768	769	770
771	772	773	774	775	776	777	778	779	780
781	782	783	784	785	786	787	788	789	790
791	792	793	794	795	796	797	798	799	800
801	802	803	804	805	806	807	808	809	810
811	812	813	814	815	816	817	818	819	820
821	822	823	824	825	826	827	828	829	830
831	832	833	834	835	836	837	838	839	840
841	842	843	844	845	846	847	848	849	850
851	852	853	854	855	856	857	858	859	860
861	862	863	864	865	866	867	868	869	870
871	872	873	874	875	876	877	878	879	880
881	882	883	884	885	886	887	888	889	890
891	892	893	894	895	896	897	898	899	900
901	902	903	904	905	906	907	908	909	910
911	912	913	914	915	916	917	918	919	920
921	922	923	924	925	926	927	928	929	930
931	932	933	934	935	936	937	938	939	940
941	942	943	944	945	946	947	948	949	950

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(1-200)

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200

(201-400)

201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230
231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260
261	262	263	264	265	266	267	268	269	270
271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290
291	292	293	294	295	296	297	298	299	300
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401	402	403	404	405	406	407	408	409	410
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CATALOG INFORMATION

601	602	603	604	605	606	607	608	609	610
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731	732	733	734	735	736	737	738	739	740
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WHERE TO BUY

751	752	753	754	755	756	757	758	759	760
761	762	763	764	765	766	767	768	769	770
771	772	773	774	775	776	777	778	779	780
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911	912	913	914	915	916	917	918	919	920
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941	942	943	944	945	946	947	948	949	950

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(1-200)

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200

(201-400)

201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230
231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260
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321	322	323	324	325	326	327	328	329	330
331	332	333	334	335	336	337	338	339	340
341	342	343	344	345	346	347	348	349	350
351	352	353	354	355	356	357	358	359	360
361	362	363	364	365	366	367	368	369	370
371	372	373	374	375	376	377	378	379	380
381	382	383	384	385	386	387	388	389	390
391	392	393	394	395	396	397	398	399	400

(401-600)

401	402	403	404	405	406	407	408	409	410
411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426	427	428	429	430
431	432	433	434	435	436	437	438	439	440
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451	452	453	454	455	456	457	458	459	460
461	462	463	464	465	466	467	468	469	470
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481	482	483	484	485	486	487	488	489	490
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CATALOG INFORMATION

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621	622	623	624	625	626	627	628	629	630
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691	692	693	694	695	696	697	698	699	700
701	702	703	704	705	706	707	708	709	710
711	712	713	714	715	716	717	718	719	720
721	722	723	724	725	726	727	728	729	730
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WHERE TO BUY

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ADVERTISER INDEX

READER SERVICE NUMBER	
144	Adaptec, Inc., 102
—	Adobe System, 74
401	Advanced Gravis, 255
1	Air Land Systems, 247
306	Aldus Persuasion, 34-35
49	allan bonadio & assoc., 76
202	ALSoft, Inc., 4
35	Altsys, 66
403	American Micro, 234
—	Anthro, 26
—	Apple Computer, Inc., 88A-88H
3	Archive Corp, 36
220	Ashton-Tate, 24-25
479	BASF, 224
187	Berkeley Systems Design, Inc., 248
459	Berol USA, 219
5	Beverly Hills Computer, 276-277
425	Caere Corp, 255
4	Cambridge North America, 282
16	Casady & Greene Inc, 33
137	Casady & Greene Inc, 33
134	Casady & Greene Inc, 86
32	CDA, 280
357	Central Point, 228
—	Checkmark Software, 250
—	Claris Corp., 42-43, 104
127	Clearpoint, 214
375	Clearpoint, 214
85	CMS Enhancements, 262
—	Compugraphic Corp., 173-175
371	Compuserve, 267
61	Computer Friends, 244
233	Corel Systems, 206
400	CTA, 98
17	Cutting Edge, Inc., 231
281	Dataviz, 96
477	DayStar Digital, 22
217	Deneba Software, 39
242	Digital Vision, 230
562	Diskette Connection, 274
174	Dove, 242
368	Dr Mac Inc., 279
155	Dubl-Click, 242
452	Ehman Engineering, Inc., 94
12	Engineered Software, 8
110	Everex, 52
101	E-Machines, 264-265
19	Forefront Graphics, 64
152	Fox Software, 256
177	GCC Technologies, 9
439	GDT Softworks, Inc., 54
195	GE Rental/Lease, 181
467	General Parametrics, 260
77	Graphsoft, 210
156	Great Plains Software, 227
124	GW Instruments, Inc., 20
440	Hard Drives Int'l., 271
383	Hayes, 112-113
344	Hewlett Packard, 216-217
254	Howtek, 268-269
167	Individual SW, 253
360	Informix Software, 100-101
—	Intuit, 199
82	Irwin Magnetics, 188
471	Irwin Magnetics, 61
457	Jasmine Technologies, Inc., 82-83
125	Jasmine Technologies, Inc., 204-205
21	Jasmine Technologies, Inc., 12
102	Jasmine Technologies, Inc., 201
30	Kensington Microware Ltd., 106-107
192	Kensington Microware Ltd., BC
261	Kent Marsh Ltd., 190
145	LaCie Ltd., 18
23	Language Systems, Inc., 80
472	Lexpertise USA, Inc., 218
354	Mac Friends, 246
449	Mac Zone, The, 68-71
406	MacAcademy, 65

READER SERVICE NUMBER	
—	MacConnection, 116-123
264	MacLand, 278
465	MacProducts USA, 222
86	MacProducts USA, 212
78	MacWarehouse, 236-241
—	Magnavox, 72
94	Mainstay, 27
33	Mansfield Systems, 67
34	MathSoft, 223
387	Maxcess, 8
435	Metro Image Base, Inc., 54
276	MicroComputer Accessories, Inc., 263
161	Micron Technology, 84
275	Micronet Technology, 251
366	Microseeds, 28
—	Microsoft, IFC-1
374	MicroSpot, 38
458	Microtech International, 77
243	Microtech International, 75
585	Microtek, 114
43	Mirror Technologies, 78-79
58	Mirror Technologies, 78-79
424	Mirror Technologies, 78-79
65	Mitsubishi, 40
413	Mobius Technologies, 247
87	Monogram, 208
160	M/H Group, 92
196	National Semiconductor, 235
347	Novell, 62-63
393	NuEquation, 259
284	Olduvai Corp, 60
45	Open Mac, 274
—	Oracle, 21
265	Orange Micro, 28
213	Paracomp, 108
138	PCAI, 89
51	Peat Marwick Advanced Technology, 281
223	Personal Computer Peripherals Corp., 56-57
42	Personal Training Systems, 185
297	Power Up, 203
317	Preferred Publishers, Inc., 220
—	Prix Ars Electronica, 266
44	Programs Plus, 46-51
451	ProVue, 263
104	QMS, Inc., 186-187
295	Quark, 192
115	Qume, 232-233
353	Qume, 232-233
46	Radius, Inc., 16-17
—	Radius, Inc., 60A-60D
106	Rainbow Technologies, 88
13	RasterOps, 55
149	Rodime, 229
296	ScanCo, 87
—	Seagate, 245
29	Secure-It, 26
239	Secure-It, 266
421	Shiva Corp., 5
117	Sigma Designs, Inc., 10-11
266	Silicon Beach Software, 110
—	Software Library, 275
358	Spectrum Holobyte, 197
185	Springboard Software, Inc., 249
414	Storage Dimensions, 183
186	Sun Remarketing, 81
455	SuperMac Technology, 91
—	SuperMac Technology, 90
112	Survivor Software, 53
215	Symantec, 15
237	Symantec, 7
302	Symmetry, 230
286	Synergy Software, 74
491	Systat, 44
492	Systat, 44
—	3M Visual Products, 179
24	Taxan USA Corp. , 93
321	Tecmar, Inc., 194

READER SERVICE NUMBER	
176	Thunderware, 6
—	Tops, 23
26	Trimar USA, Inc., 234
22	Tri-Data, 41
445	Truevision, 29
332	T/Maker, IBC
54	USA Flex/Comark, 275
93	Varityper, 30-31
27	VeloBind, 221
469	Ven-Tel, 58
267	Zericon, 222

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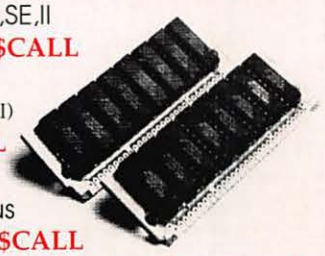
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1. The Seller must ship your order within 30 days of receiving it, unless clearly stated otherwise in the advertisement.
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DO'S AND DON'TS

By mail:

- Compare prices, including sales tax and shipping fees, before you order. Your purchase may be exempt from sales tax—check your state laws on collection regulations. Handling, packing, and shipping fees are legal and most states tax these services.
- State the precise specifications of the merchandise, such as model, make, size, component parts, etc.
- Confirm the price and expected delivery date as advertised.
- State on your order whether you will accept substitute merchandise if the item you specified is unavailable. If you won't accept a substitute, state that your payment should be returned.
- Record of payment is essential if a problem arises, so do not send cash.
- Keep copies of your order and all associated correspondence. Your records should include the company's name, address, and phone number; a description of the merchandise; your canceled check or money-order carbon; the date you mailed the order; and any sales slips and shipping receipts.
- Do not insure your order. It is the Seller's responsibility to make sure you receive your merchandise.

By phone:

- Note the name of the person who takes your order, and the time and date of your conversation.
- Make a record of your order, the price, promised availability, and the expected components.
- Save all correspondence, including your canceled check or money-order carbon and any written confirmation sent by the Seller.

Questions to ask:

- Does the advertised merchandise include all necessary parts and accessories? Are they made by the same manufacturer? Is the version number or model number the same? Is the product compatible with the hardware/ software you intend to use it with?
- Can your order be shipped immediately? If not, when will it be available for shipping?
- Has the advertised price increased?
- What warranties does the merchandise carry? Who provides the service?
- What is the Seller's return policy? Exchange or repair? The refund policy?
- If a problem arises, with whom should you correspond?

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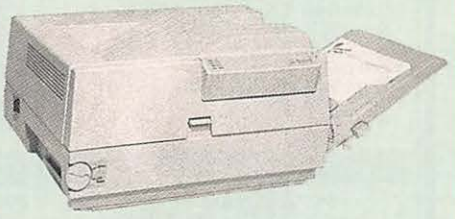


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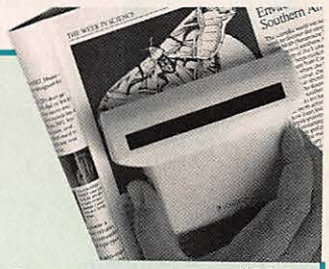
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MacDraw II 319
FileMaker II 235
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Compuserve Navigator 40

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Canvas 2.0 150
Comment 2.0 51
Coach Professional 99
Coach Professional Network 263

DMA
MacTerm 73

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WingZ 270

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Dreams 272
Symbol Library 139

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Quicken 33

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Silver Server 89

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Mac SQZ 46
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TRAVELING SOFTWARE
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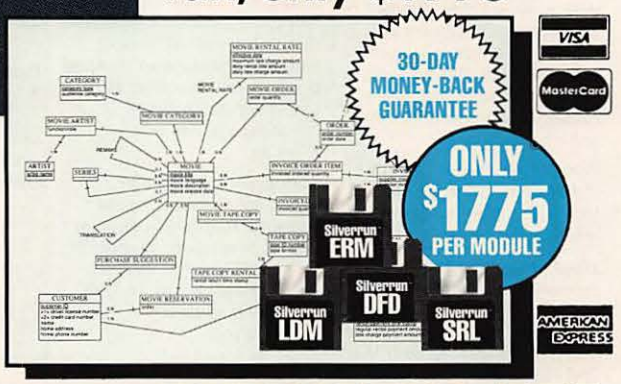
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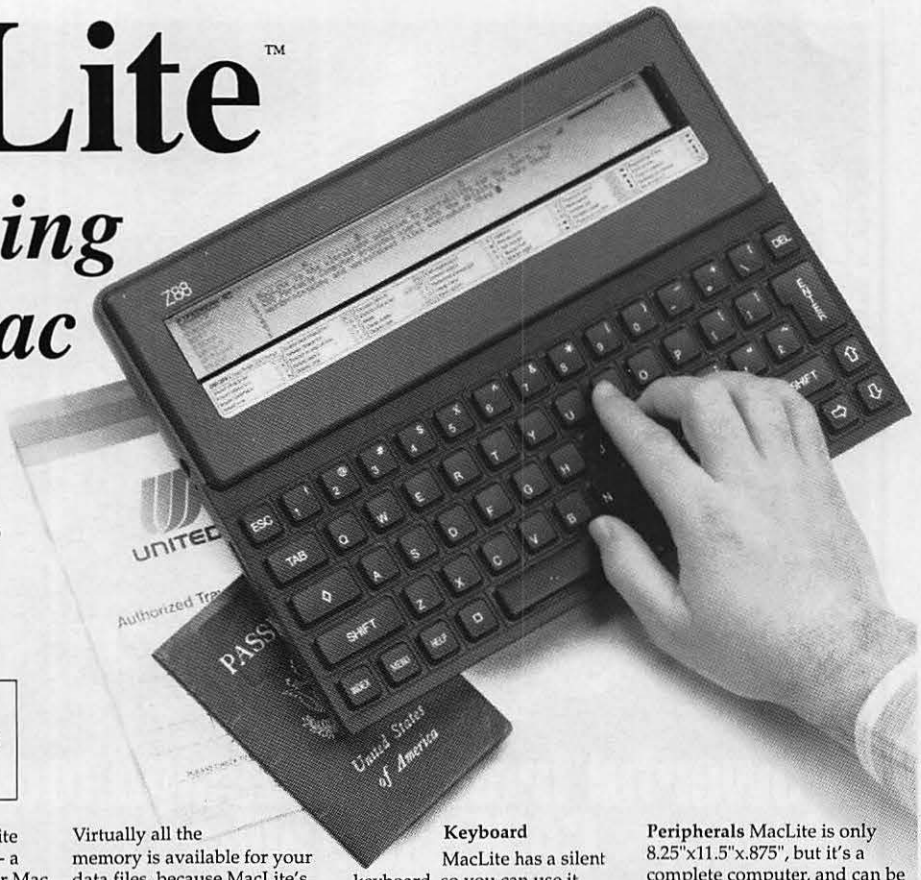
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Accessories

Furniture 285
Hardware 285
Mouse Pads 285
Supplies 285

Hardware

Bar Code 286
Computer Systems 286
Data Acquisition 287
Emulators 287
Expansion Chassis 287
Memory Upgrade 287
Miscellaneous 289
Networking 289
Peripherals 289
Printers 290

Hypercard Stacks

290

Services

Data Conversion 291
Desktop Publishing 291
Disk Duplication 292
Laser Recharge 292
Training 292

Software

Accounting 292
Artificial Intelligence . 292
Bar Code 292
Business 293
Clip Art. 293
Communications. 294
Data Base. 294
Desktop Publishing. ... 294
Educational.. 295
Engineering.. 296
Entertainment.. 297
Fonts. 297
Fund Raising. 298
Genealogy. 298
Graphics 298
Health 298
Investment 298
Languages 298
Medical 299
Music/MIDI 299
Networking 299
Personnel 299
Programming Tools 300
Public Domain 300
Real Estate 300
Recreational 300
Religion 301
Rental 301
Retail 302
Sales/Marketing 302
Scientific 302
Statistics 302
Utilities 302
Word Processors 302

Miscellaneous

Business Oppor. 302
Mailing Lists 302

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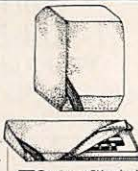
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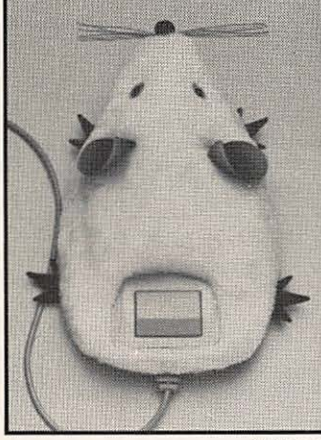
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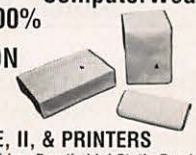
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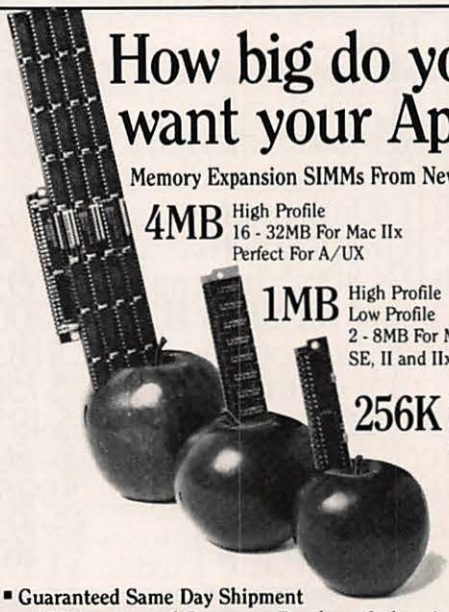
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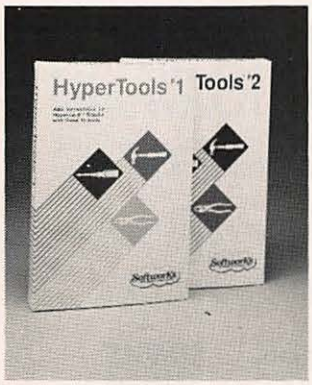
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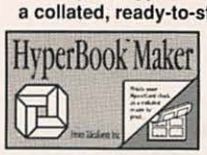
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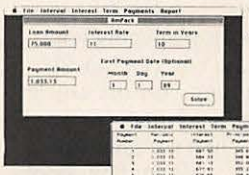
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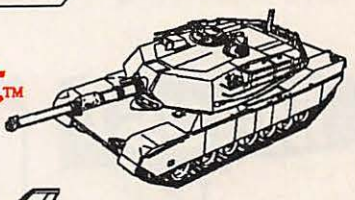
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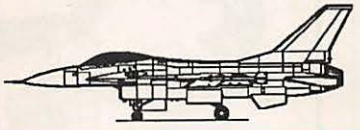
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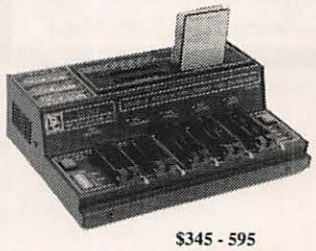
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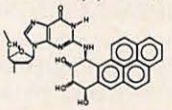
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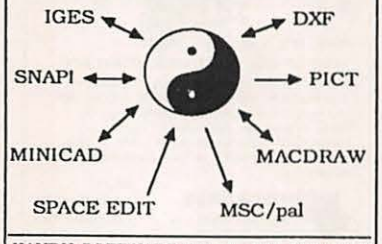
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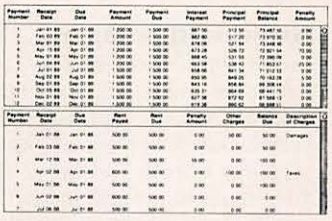
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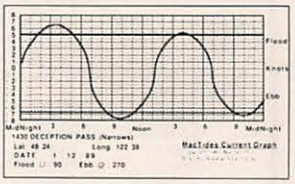
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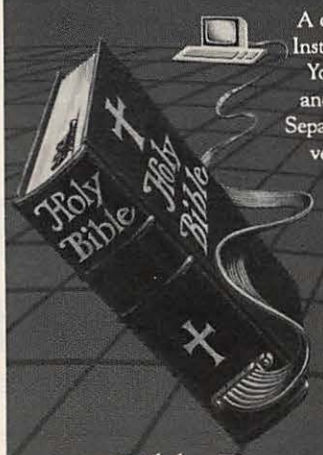
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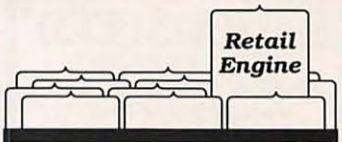
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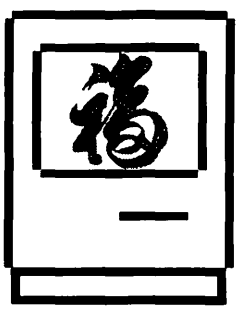
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BEST-SELLERS

Months on chart	Last month	This month	BUSINESS SOFTWARE
27	1	1	**Microsoft Works** *Microsoft*
48	2	2	**Microsoft Word** *Microsoft*
39	3	3	**Microsoft Excel** *Microsoft*
35	4	4	**PageMaker** *Aldus*
4	—	5	**MacInTax** *SoftView*
8	8	6	**WordPerfect for the Macintosh** *WordPerfect*
7	6	7	**QuarkXpress** *Quark*
24	5	8	**MacWrite** *Claris*
37	10	9	**MacDraw** *Claris*
10	—	10	**WriteNow for Macintosh** *T/Maker*

			EDUCATION SOFTWARE
2	1	1	**Where in the World Is Carmen Sandiego?** *Brøderbund*
31	3	2	**Math Blaster** *Davidson & Associates*
15	2	3	**Reader Rabbit** *The Learning Company*
28	5	4	**Typing Tutor** *Simon & Schuster Computer Software*
28	4	5	**KidsTime** *Great Wave Software*

			ENTERTAINMENT SOFTWARE
30	1	1	**Flight Simulator** *Microsoft*
31	4	2	**MacGolf** *PCAI*
27	2	3	**Dark Castle** *Silicon Beach Software*
12	—	4	**Falcon Spectrum** *Spectrum HoloByte*
11	3	5	**Beyond Dark Castle** *Silicon Beach Software*

			NETWORK/DATA COMMUNICATIONS
27	1	1	**TOPS** *TOPS*
23	2	2	**AppleShare** *Apple Computer*
18	3	3	**PhoneNet** *Farallon Computing*
3	5	4	**MacLink Plus** *DataViz*
7	—	5	**Smartcom II** *Hayes Microcomputer Products*

Months on chart	Last month	This month	HARD DISKS*
8	—	1	**SD 20 Macstack** *CMS Enhancements*
4	5	2	**DataFrame 30/XP30** *SuperMac Technology*
5	3	3	**EMAC 20 External** *Everex*
23	4	4	**Apple Hard Disk 20SC** *Apple Computer*
15	—	5	**Rodime 20 Plus External** *Rodime*

			ADD-IN BOARDS
18	1	1	**Radius Accelerator** *Radius*
5	2	2	**Radius Interface Display** *Radius*
10	—	3	**Macintosh II Video Card** *Apple Computer*
16	4	4	**Apple 1MB Memory Expansion Kit** *Apple Computer*
17	5	5	**Apple 2MB Memory Expansion Kit** *Apple Computer*

PRODUCT WATCH

Editors' choice of other recent or forthcoming products of particular interest.

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Nikon Film Scanner LS-3500
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Source: Exclusive InfoCorp survey of more than 125 Macintosh retailers and selected mail-order vendors. Covers sales during January 1988.

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Maximum recommended document size (in pages)	Over 2,000	240	50	500
Number of open documents	Unlimited *	1	30	30
Mail merge	**Yes**	No	No	Yes
Number of editable, on-screen columns (WYSIWYG)	4	1	1	1
On-screen auto-numbering footnotes	Yes	No	No	No
Automatic repagination	Yes	Yes	No	No
Graphics in same line as text	Yes	No	Yes	Yes
Multiple headers and footers	Yes	No	No	Yes
Extensive Undo	Yes	No	No	No
Variable line spacing (in points)	Yes	No	No	Yes
Selective font, size, style, and ruler changes	Yes	No	No	Yes
MacUser Magazine's Best New Word Processor	**Yes**	No	No	No
Search for a word	2.4 *sec*	7.6 *sec*	9.5 *sec*	9.7 *sec*
Spell Check document	6.3 *sec*	2 *min* 34.0 *sec*	2 *min* 2.3 *sec*	1 *min* 48.0 *sec*
Copy & Paste large area	6.8 *sec*	1 *min* 0.9 *sec*	12.4 *sec*	12.3 *sec*
Change font size of document	10.7 *sec*	50.2 *sec*	17.6 *sec*	16.2 *sec*
Change font of document	10.8 *sec*	37.1 *sec*	14.1 *sec*	15.2 *sec*
'Save As' a 12-page document	3.6 *sec*	9.4 *sec*	20.3 *sec*	19.6 *sec*
Retail Price	$195	$125	$175	$395
Happy Users	***Yes***	*?*	*?*	*?*

* Number determined by Macintosh system constraints.



...*Happy Users!*

Our users love WriteNow—a claim our competition can't easily make for their products.

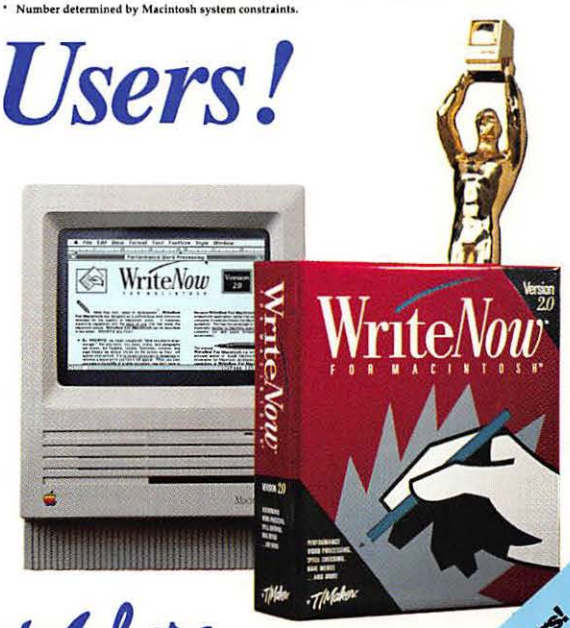
How do we know? Because our users tell us—on registration cards, on the telephone, on bulletin boards, and in letters.

We've heard dramatic stories about how WriteNow has significantly reduced training and support costs. And how clean, fast, and enjoyable it is to use. And how WriteNow got the job done when our competition sputtered.

You see, at T/Maker we feel a great word processor is more than just a stockpile of features. It's the *usability* of those features—how easy they are to learn and use, and how they *feel* under your fingertips when doing real work.

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WriteNow 2.0 is *the* user's choice for best Macintosh word processor—*and we'll show anyone our customer registration cards to prove it!*



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Fixed Line Spacing • MultiFinder/Network Compatibility • and More!

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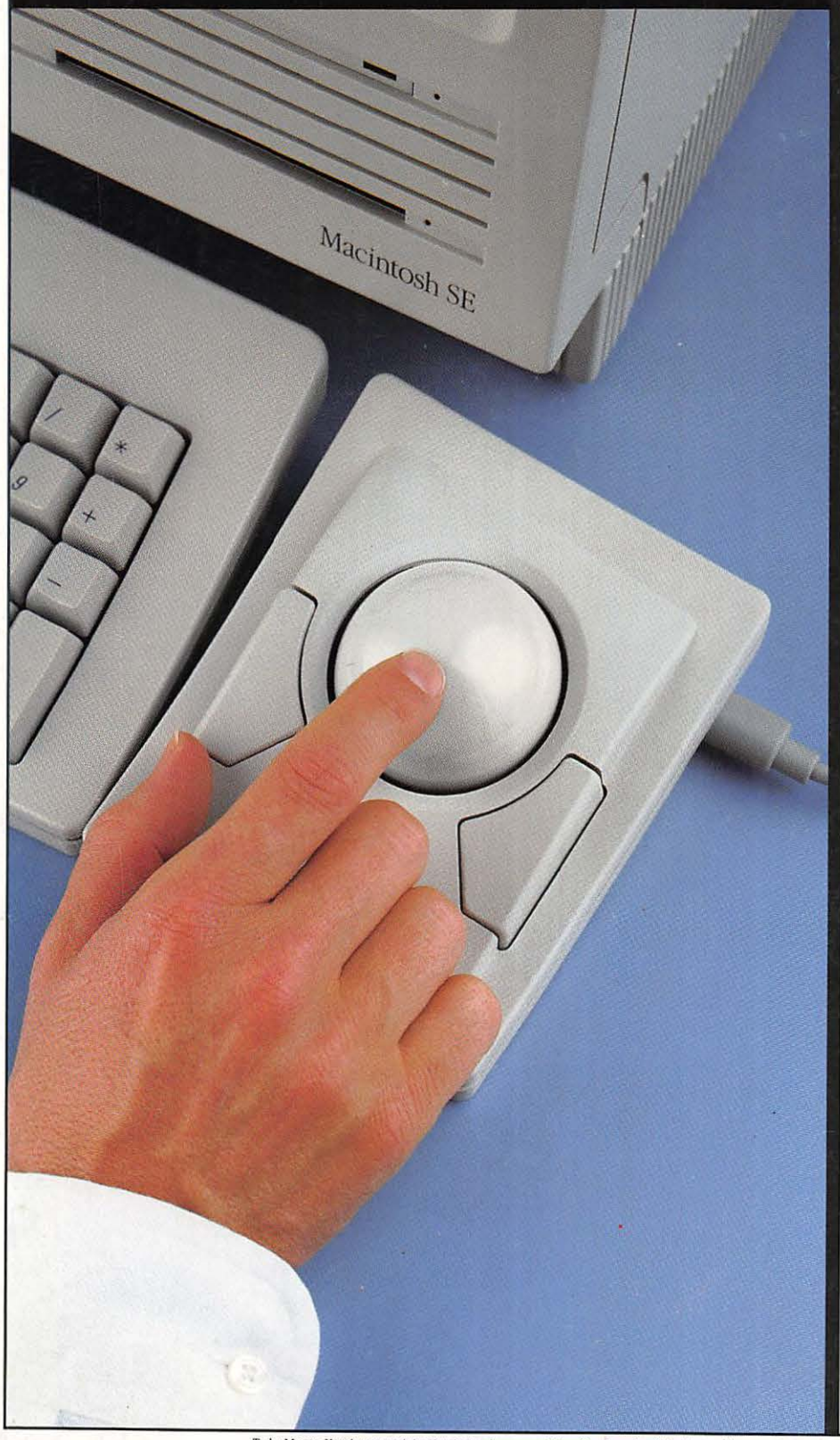
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